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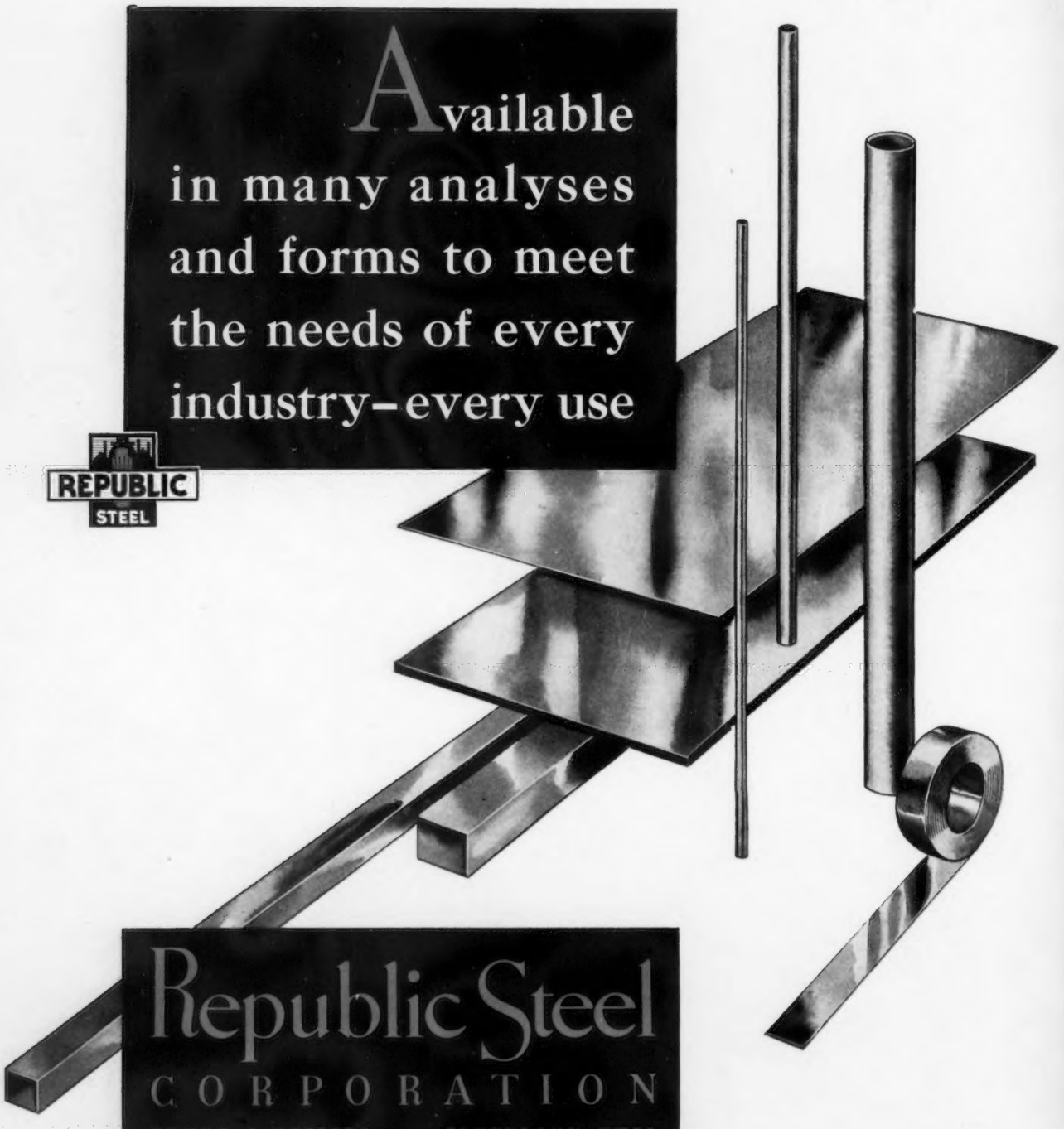

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THE IRON AGE

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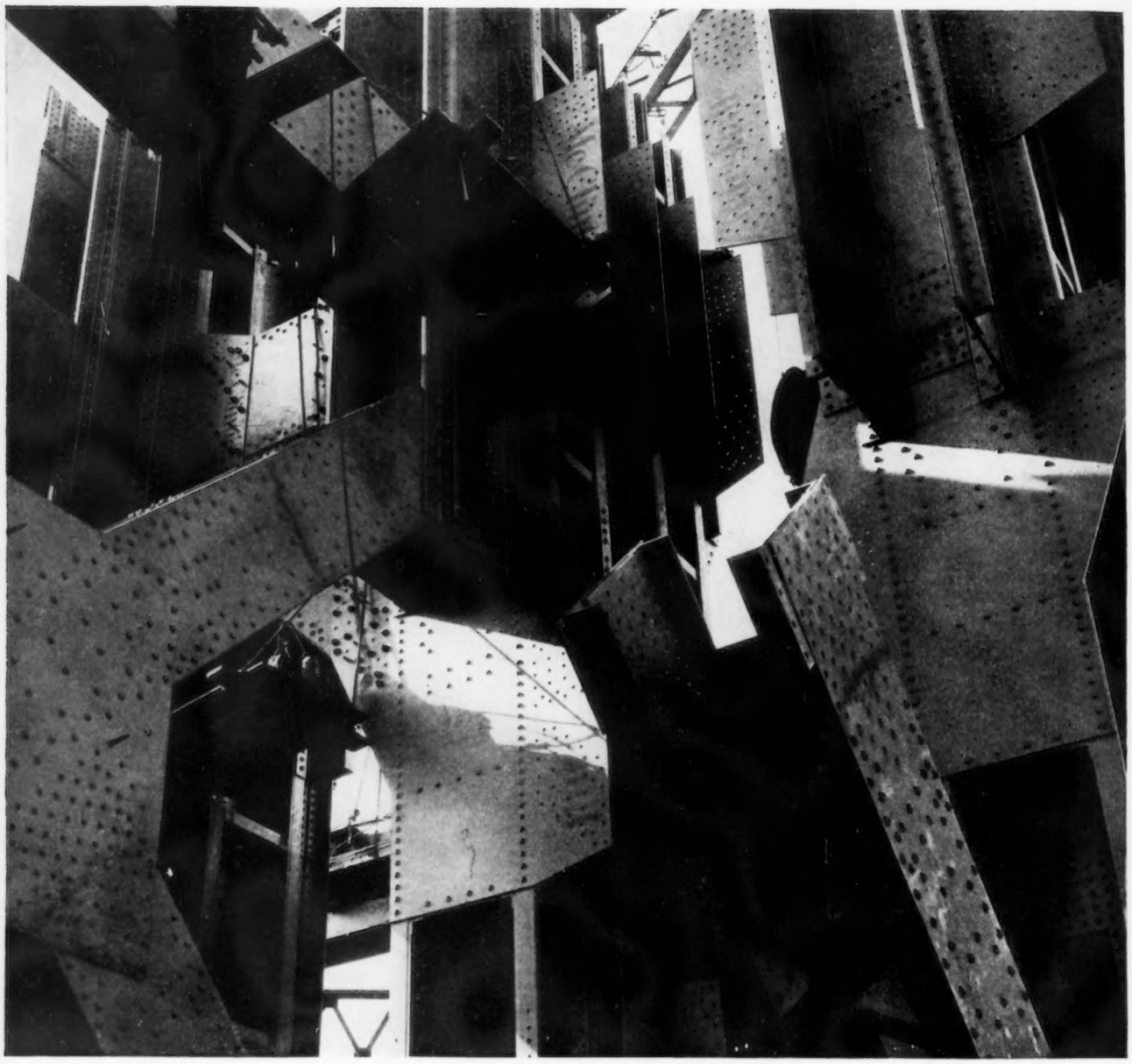

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...THE IRON AGE...

JANUARY 16, 1936

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More Flies With Sugar

RUSSIA, in changing over from its provisional republican government to Communism, found it necessary to regiment agriculture. Farmers, the world over, are inclined to individualism. Observation has taught them that the "acts of God" such as rains, droughts, heat and cold, are far more instrumental in shaping their destinies than are acts of men.

If Russia had had the comparatively inexhaustible purse or taxing power of its neighbor, Uncle Sam, the Comintern under Lenin might have well employed a different and more efficient course in sovietizing its agriculture. One can catch more flies, political or otherwise, with sugar than with vinegar. Bounties to farmers for accepting regimentation and dictatorship either to increase or decrease production might have secured compliance more quickly and with less mortality than the use of firing squads.

It is because of the sinister significance that enshrouded AAA as an effective entering wedge of Communism in America that many of us, in agriculture as well as industry and business, rejoice at its downfall. And we do this without prejudice to the belief that the farmer is entitled to a larger share of the national income. The point is that some things are bought at too dear a price.

Collective action, in a Republic, must come from persuasion and cooperation, not from compulsion. Ways can and will be found by the American people, through its Congress, to do justice to agriculture without permitting those of avowedly communistic belief to slip into seats of unlimited dictatorial power by means of a modern and alphabetically labeled Trojan horse.

Recovery in America began from the day that the companion masterpiece of the New Deal, the NRA, was declared null and void. And that despite the prophecies of chaos with which its advocates greeted the event.

It may well be remembered that the demise of AAA will be found to mark a new and better day for agriculture.

A Symposium on Progress

Technological Innovations of the Year Interpreted by Authoritative Specialists

WHAT were the significant or important developments in metallurgy and production during the past twelve months? In order to present as broad a picture as possible, THE IRON AGE asked 16 metallurgists and industrialists, located here and abroad, for brief reviews on what they regarded as conspicuous improvements in manufacturing procedure or outstanding contributions to the science of metallurgy. These opinions are presented here.

Skin Formation in Steel Castings

Regarding what I consider an important achievement during the past year, I might point out that nothing is more important in an industry than the establishment of fundamental facts. Therefore, the publication of the findings of Briggs and Gezelius of the United States Naval Research Laboratory on "The Rate of Skin Formation" may properly be assessed as an important achievement in the steel castings industry.

The work of these investigators was delivered to the convention of the American Foundrymen's Association at Toronto, Canada, in August last, and is the third in a series of papers on "Studies on Solidification and Contraction in Steel Castings."

The data furnished by these two workers in the Naval Research Laboratory must be of profound interest to engineers and designers as well as to operative steel foundrymen, because the facts evoked in the research reveal, more clearly than anything previously published, the effect of the coolant (the mold) upon the metal (the casting) in relation to the production of integrally sound cast structures.

It is not to be assumed that the interrelation of mold and metal is limited only to the production of steel castings. Makers of iron and non-ferrous castings may find in this recent work much information of value.

While, in its major aspect, the work deals with the relation of mass or volume of cast metal to

GEORGE BATTY

area of contact with mold —and all that is implied thereby when considering castings of complex design and widely differing section thicknesses — it also stresses the importance of certain elements of design, notably "mold-corner effect" and "metal-corner effect" in a manner which is bound to lead practical foundrymen to a more exhaustive study of the means whereby controlled directional solidification may be so ordered as to produce castings free from such dangerous discontinuities as pipes and internal hot tears.

As the demands of industry upon the founder become more onerous—as for instance, high temperatures and high pressures in the processes in the oil industry — foundry technique needs and welcomes scientific data of the kind furnished in the work of Briggs and Gezelius.

GEORGE BATTY,
Consultant on Steel Castings,
Drexel Hill, Pa.

• • •

Developments in Steel Castings

In our industrial history for 1935, steel castings stand out much more by reason of wide distribution than by the tonnage produced. It now appears from the Government reports covering the first three quarters of the year that the output of the industry may not have exceeded 28 per cent of its present capacity. This figure fails to indicate the volume represented by diversification, because the percentage output was greater for miscellaneous uses than for railroad equipment. It seems that the proportionate output for the former was about 35 per cent. It is reasonable to expect a considerable production of railroad castings in 1936, with resulting good effect on total steel foundry output.

The extended use of miscellaneous castings naturally has been accompanied by the wider application of alloy cast steels. This industrial demand was stimulated by circumstances that have prompted increased dependence on the foundry's

R. A. BULL

product. To cite an example, consider the satisfactory use of cast crankshafts for upward of two million automobiles. Apparently the savings thus accomplished for car builders were considerable, and were effected while improving serviceability.

The American Society for Testing Materials in 1935 tentatively adopted ten recently formulated specifications for steel castings. There are 13 grades, including eight of high alloy composition, covered by these new specifications. The extent to which diversification has advanced is shown by this unprecedented activity in drafting authoritative purchasing requirements for the steel foundry's product.

The general trend toward alloy steels naturally resulted in some new compositions of cast steel during 1935. Although this indicates progress, the large number of metal grades now available is confusing to some purchasers. The circumstance calls for the exertion of informative effort by foundrymen, and reliance on them for advice regarding the variety of metal best adapted for the intended use. The most striking example of such educational work that has ever been done is found in the *Cast Metals Handbook*, published during 1935 by the American Foundrymen's Association. This volume should be of value to many consumers of steel and other castings because it contains much data that were assembled and analyzed carefully, covering the present-day product of each branch of the foundry industry.

R. A. BULL,
Consultant on Steel Castings,
Chicago, Ill.

• • •

Centrifugal Casting

Although the centrifugal casting method is not a recent innovation in the foundry, its use is being extended to include many new products including a variety of casting alloys. This method of producing cylindrically shaped castings has the advantage over all other methods of casting in eliminating the use of cores to form internal surfaces. Furthermore, the centrifugal force caused by the rotation of the molds is utilized in obtaining a dense metal free from defects.

H. L. CAMPBELL

In most of the machines used for making centrifugal castings, the mold is rotated about a horizontal axis. The surface of the mold may be either of metal or refractory sand. Some metal molds are jacketed so that the heat conducted from the solidifying metal can be carried away from the wall of the mold. Other metal molds are allowed to absorb and radiate the heat from the cast metal. A novel variation in the practice is to have the centrifugally cast metal unite with the metal mold to obtain the desired composite structure, as is done in the making of "centrifuse" brake drums.

Sand-lined molds are often employed in making castings by the centrifugal method. The molding sand is rammed around metal patterns within cylindrical flasks which are transferred later to the centrifugal casting machines. Cast iron pipe up to 30 in. in diameter and 16 ft. in length is now being produced by this method. Also, large numbers of sleeves for truck and bus motors are made in sand-lined molds.

When cast iron is cooled rapidly in contact with metal molds, a hard (chilled) section is produced, the thickness of which is dependent on the composition of the cast iron. An annealing treatment is usually required to soften the metal in the casting so that it can be machined. Recently, a method has been developed by the United States Pipe & Foundry Co. for making cast iron pipe centrifugally in steel molds without having a chilled surface. This method was described in 1935 by H. W. Stuart in a paper presented to members of the American Foundrymen's Association. Briefly, the method consists of applying an insulating material in powdered form to the surface of the mold in advance of

the stream of metal. A very thin coating of the powdered material retards the heat abstraction from the molten metal sufficiently to prevent the formation of a white-iron structure. Cast iron pipe produced in the coated molds has superior properties to pipe made in contact with uncoated metal surfaces.

The centrifugal casting method is employed in making cast iron pipe, alloy steel gun tubes, bronze bushings, babbitt linings in connecting rods, small tubes of heat-resisting alloys, large retorts for furnace parts, cast iron brake drums, and cast iron liners for internal combustion motors. The development made in the centrifugal casting method and the uses of this method in the manufacture of new products are of great significance to industry.

H. L. CAMPBELL,
Associate Professor of Metal Processing, University of Michigan.

• • •

Welding and Casting Designs

In my opinion the most important achievements of the past year were not entirely new discoveries but were processes that had been constantly developed in preceding years. And in 1935 these processes resulted in many practical industrial installations of far reaching commercial importance. For example, consider the great strides that have been made in gas cutting, metallic arc welding with covered electrodes, spot welding, development of alloy steels for welding, controllable protective atmospheres used in either oil or gas fired or electric furnaces for heating, annealing or heat treating.

It is impressive to witness the cutting by a gas machine of rolled steel plates three or more inches in thickness, thereby converting the plate to a shape having a complicated profile with a finish equal to rough machining. This cutting procedure is followed by fabrication by welding. Equally impressive is the quick and accurate cutting of thinner plates which may be assembled by either welding or riveting. Likewise, sections of rolled plates may be gas cut and welded to form an assembly which is competitive with cast steel. The soundness of these

LEWIS H. FAWCETT

built-up structures may be thoroughly determined by X-ray examinations in addition to the usual chemical and physical tests.

Design plays an important part in such assemblies for the developments actually originate on the drawing board. For years the principal manufacturers of rolled steel plates, shapes, etc., have distributed excellent handbooks for the guidance of designing engineers who use their products. Much thought is now being given to design for welding. Why not more thought for casting design? Handbooks on welding design and design for castings would be generally used by the trade as they also would be useful reference books for modern industry.

Worthy of note is the development of controllable protective atmospheres as applied to electric furnaces or to fuel fired furnaces of the radiant tube type. The latter type of furnace is free from the products of combustion of the fuel and thus offers a medium, similar to an electric furnace, for complete atmosphere control. In the case of the fuel fired furnace as with the electric furnace, the atmosphere for the protection of the heated metal is produced by a unit independent of the heating system.

These combinations are being utilized very successfully for bright annealing of steel, copper and copper alloys. Likewise for scale free hardening and electric furnace brazing.

Thus 1935 has been a year of development of the results of scientific discoveries. For there were many years of basic research back of these developments.

LEWIS H. FAWCETT,
Metallurgist, Naval Gun Factory.

• • •

Galvanizing Innovations

During 1935 galvanizers were much interested in reducing fume hazards and in the handling and treating of waste pickle liquors. Most members of the trade are astounded

WALLACE G. IMHOFF

when they are told that a small steel plant will in one year run 719 tons of iron and over 4,000,000 gallons of waste pickle solution into a convenient river. With many plants all running these liquors into rivers, the full extent of pollution of the waters can be appreciated. Active interest during the past year, therefore, has been centered in developing some economical way to handle these millions and millions of gallons of waste pickle from our steel plants. This is not an easy problem, although considerable progress has already been made.

The galvanizing industry in 1935 has been busy trying to find a practical and economical method for handling the enormous volume of waste pickle liquors now being run into the sewers and rivers. The recent movement to stop the dumping of these liquors into the rivers has created an active interest in solving the problem of how to treat these waste liquors economically.

The vexing question of fumes and vapors from pickling and galvanizing departments has also been the subject of much study. The nature of these fumes has made the problem exceedingly difficult to solve since there are steam vapors, acid vapors, flux fumes from the galvanizing pot, and various other fumes from combustion, etc. The lines of the present attack are on the elimination of the causes as far as possible and the installation of ventilating and air conditioning equipment to carry off the remainder of the fumes. Due to the corrosive action of the fumes upon the equipment, the matter is far from being solved in a satisfactory manner. Work and study continue, however, and progress is being made.

Continued study is also being made on galvanizer's dross. Corrosion after pickling has been proved to furnish a large part of the iron to form this dross, and improved conditions are obtained by washing after pickling, employing the proper fluxing methods, and reducing the corrosion on the surface to an absolute minimum. Changes in galvanizing furnace design and construction have also been noted for both oil fuel and coke fuel, and an entirely new type of furnace has been designed and protected by patent No. 1,974,610. The subject of spangles on galvanized iron has been the subject of a

series of articles in one of the trade journals, and the question of weight of coating for heavy plates has also received attention. The quality of the zinc coating has engaged the attention of a number of galvanizers, as well as the quality of the metal used in the galvanizing process. Such features as smoothness of the coating, brightnes sof the coating, number of dips according to the Preece test, etc., have also been afforded considerable attention by many galvanizers.

WALLACE G. IMHOFF,
President, the Wallace G. Imhoff Co., Consultant in Zinc and Tin Coatings.

• • •

Special Cemented Carbides

Historians have a passion for studying the tools used by the ancients. It has been contended that industrial development can be measured by progress in tool improvement. Better tools sometimes result from a more effective utilization of old materials. They also come from improvements in the tool materials themselves. An outstanding example of the latter was the development of high-speed steel, which became generally available early in the present century. So great has been its advantage that certain mechanical engineers estimate that it has now made possible the production in five days what otherwise would have taken six.

The newest addition to the family of tool materials is cemented carbide. Although it has been available in the United States for more than six years, certain 1935 events with reference to it are sufficiently significant to be recorded. These events are as follows:

(1) In 1935 the cemented carbide consumption in the United States was the largest for any year, and was about three times that for 1932.

(2) Machine tools with sufficient rigidity and power to utilize the inherent qualities of the cemented carbides have been developed by the leading builders of such equipment.

(3) While tungsten carbide cemented with cobalt is still more used than all other cemented carbides combined, the year has witnessed the development of several special grades for special purposes. These include, principally, (a),

ZAY JEFFRIES

variations in tungsten carbide cemented with cobalt; (b), combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel, or both; (c), tantalum carbide cemented with nickel or cobalt; and (d), combinations of tungsten carbide and titanium carbide cemented with cobalt.

(4) The cemented carbides have entered the equipment field as distinguished from the tool field. One machine, for example, has been equipped with 25,000 cemented carbide wearing surfaces. The life is in some cases more than 100 times that of steel.

(5) During the past year, a one-piece cemented carbide die weighing 5½ lb. was made and put into service. This is the largest piece made so far, at least in the United States.

(6) A new device for the home has been developed which depends on cemented carbide for economic operation. It is a kitchen waste disposal unit which reduces garbage, including bones and other hard substances, to a pulp which can be washed down the drain pipe.

ZAY JEFFRIES,
President, Carboloy Co., Inc.

• • •

Greater Accuracy in Steel Making

A very significant recent development in practical steel metallurgy, from my viewpoint, is the increasingly widespread recognition, on the part of the steel man, of the usefulness of instruments and methods developed on the basis of a scientific study of his problems. This changing attitude appears to be due to two main causes. First, because of the desire of the steel maker to economically produce material which will consistently satisfy the more and more exacting demands of the customer. Second, because he is acquiring confidence in conclusions based on evidence accumulated by careful investigation, whereas he was — and often very properly — distrustful of "hunches" supported more

JOHN JOHNSTON

by the enthusiasm of the promoter than by pertinent evidence.

Every day the steel industry faces new and difficult problems in meeting conditions imposed by the new methods adopted by other industries. In solving these problems, it is making systematic investigations of how the many possible variables, inevitably present in its whole sequence of operations, affect the usefulness of its products. In any one operation this variability may be apparently slight, or even hardly appreciable, and yet it may influence decisively the quality of the final product. Metallurgical phenomena eventually prove to be not mysterious, but merely complex because of the number of variables and frequently obscure factors which may play a part. Metallurgical processes are therefore in principle identical with other physico-chemical processes and can likewise be brought under more complete control.

Control in steel making has until recently been largely a matter of the skilled eye and experience of the operator, and was properly so as long as there was no better way. But mill operators are now realizing that some of the newer requirements necessitate a precision beyond this; and this real need is bringing about a gradual adoption of better instruments and of methods which promise an operator much better control as regards to uniformity and quality of his product.

During the great early development of the steel industry, attention was directed largely to the economies resulting from the use of machines on a larger and larger scale. This was possible because knowledge of what machines can be made to do had advanced so far that the economies could readily be visualized and evaluated, even by a non-technical man. The state of knowledge of the fundamental metallurgical phenomena was much less advanced, largely because they are much less easy to visualize and manage at will, even by those who are technically trained. Rapid progress in this direction is now being made, and there can be no doubt that this is bringing about continual improvement in product. It is thus evident that there is within the industry a more general conviction that the fine art of steel making must be supplemented by more pre-

cise knowledge which, because of the fundamental complexity of steel metallurgy and treatment, can come only from careful investigations in which use is made of all the tools which science can offer.

JOHN JOHNSTON,
Director of Research, United States Steel Corpn.

• • •

X-Ray Procedure at Naval Gun Factory

One of the outstanding 1935 developments in metallurgical practice was

GERALD D. LINKE

the design and use of portable X-ray equipment in foundry and welding control. This equipment gives foundrymen and welding engineers a new tool, an instrument which can be moved with little or no trouble from shop to shop for the non-destructive inspection of castings and weldments.

It is no longer necessary for an organization desiring the use of X-ray equipment to build a large lead-lined room and to transport materials to this one central station to undergo this type of non-destructive testing. One of the first questions to enter the mind of the user is "will the personnel obtain any harmful results from stray radiation?" As a result of a series of tests carried on by the writer at the Naval Gun Factory it was determined that no stray radiation is given off by the newly designed machines. X-ray examination is very quick and gives excellent results.

The method used in foundry control at the Naval Gun Factory is somewhat as follows: When a new design is made, a pilot casting is manufactured from this design. The casting is immediately X-rayed throughout, special emphasis being placed on the areas requiring high shock resistance. The X-ray films are immediately developed, and after they are dry they are inspected by representatives of the inspection and production department. If the casting shows any serious defects the foundryman is able to change his practice. The design section may be called into conference and often slight changes may be made which will result, with proper foundry control, in the production of sound castings.

The main source of supply for the electrical energy for the 220,000 volt portable type of X-ray machine at the Naval Gun Factory is 220 volt single phase. Connections for this voltage are readily available throughout the factory.

C. M. Underwood, senior welding engineer, and E. J. Ash, former assistant metallurgist at the Naval Gun Factory, gave a very interesting paper before the American Foundrymen's Association at Toronto, Canada, last August. The title of the paper was "X-Ray and Welding, the Fundamental Aid to Quality Steel Castings," and in this paper there was described the use of portable X-ray equipment by the Naval Gun Factory in foundry and welding control in the manufacture of ordnance steel castings.

LIEUTENANT GERALD D. LINKE,
Metallurgist, Naval Gun Factory.

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New Metals Lower Transportation Costs

One of the most striking developments of the past year was the growing appreciation of the economic waste involved in dead weight movement on many types of moving or mobile equipment, and the progress made in the salvaging of much of this loss through the more extended and intelligent use of strong, light-weight construction. Obviously, every pound saved in the construction of containers for the transportation of anything can be translated directly either into a reduction in power necessary for a given pay load or an increase in pay load for the same power. In the latter case, the advantage is not confined to a lower

PAUL D. MERICA

power cost per unit of weight transported, for increased load per trip also connotes an enlarged capacity for the same equipment with consequent savings in all other unit operating costs. If, for example, a 16 cubic yard coal stripping shovel dipper is so constructed that its gross weight fully loaded is no greater than that of a conventional 12 cubic yard dipper (as was done by the Northern Illinois Coal Co.), 33 1/3 per cent more coal is moved without any increase in either power or labor cost.

The lion's share of the publicity in connection with lightweight construction has been bestowed on streamlined passenger trains but, without any intention of detracting from their deserved popularity, it may fairly be said that they occupy but a minor spot in the economic possibilities of this development. Its real future lies in the transportation of commodities and raw materials, not human beings. Hopper cars, box cars, gondola cars, motor truck bodies, tractor and power shovels, and mine hoisting skips are a few of the items in which distinct progress has already been made. There are now in actual service hundreds of freight cars embodying a dead weight reduction of 20 to 25 per cent, motor trucks with body weight reduced by half, and mine skips hoisting 16 per cent more ore with no increase in power or enlargement of equipment.

For many parts, such as railway car side frames, bolsters and yokes, an appreciation in the strength-weight ratio without loss of toughness fills the bill, but in other cases corrosion is also a factor and reduction in section must, therefore, be compensated for by an increased resistance to whatever corrosive environment is involved. Fortunately, many of the higher strength constructional steels now on the market incorporate this necessary added corrosion resistance.

Experience in the development of light-weight construction has been so far very encouraging, and it warrants faith in the future economic possibility of this interesting development.

PAUL D. MERICA,
Assistant to the President, International Nickel Co., Inc.

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Balanced Blast Cupola

I consider that one of the most important developments in the foundry industry during the past year has been the increased use of the British Cast Iron Research Association's balanced blast cupola. This applies chiefly to Great Britain, since only a few of these cupolas have been installed in other parts of the world, although some are actually in operation in the United States, Australia, India and in various countries in Europe. I can give

the above opinion more easily since I have not been directly concerned with the cupola's invention and development.

Although invented in 1930, the cupola has taken time to develop, and is only now coming into its own. The following figures show the cupola's progress during the past year: At the beginning of 1935 there were 54 cupolas in operation, and at the end of 1935 there were 84 cupolas in operation and 19 under construction. At the present time the cupolas in operation and under construction are capable of an hourly output of 707 tons.

It may be pointed out that during the development of the cupola the British Cast Iron Research Association has, with the cooperation of its members, accumulated a large amount of valuable information on cupolas working under very varied conditions, and this knowledge is of great assistance in advising on and designing new installations. The principle of the cupola, with its adjustable air supply to main and auxiliary tuyeres, is now well known, and has been described elsewhere. The advantages of the cupola include coke economy (up to 40 per cent savings have been effected); hot and clean metal, giving sounder castings and reduced scrap; ease and cleanliness of working and adaptability to different charges and speeds of running; absence of flame at charging door, which has proved an advantage in hot countries, and so on. The cupola is patented in the United States and inquiries from interested parties would be welcomed.

Another development on which the association has been working is the production of very fine graphite structures on thick sectioned sand castings without the use of chills. It is hoped to publish details of this work in the near future.

A. L. NORBURY,
Senior Metallurgist,
The British Cast Iron Research Association.

Rapid Refining of Steel

In my estimation, the most important development in metallurgy during the past 12 months was an improved process for the rapid refining of steel put in practice at the plant of Ugine Perrin. It is known that this process consists in principle in a vigorous boiling of liquid steel with a suitable fluid slag. By choosing a proper slag, it is possible to obtain in one operation of a few minutes duration any degree of refinement which may be desired, i. e., dephosphorization, deoxidation, etc.

ALBERT PORTEVIN

The rapidity with which this refining operation can be performed has a considerable bearing on the price at which the steel can be sold. And this new procedure, whereby the refining time is greatly reduced, marks a revolution in the manufacture of quality steel, obtainable up to now only by prolonged operations in the open-hearth or in the electric furnace. In addition to this price saving, a steel producer is also able to visualize and forecast an exactness of operations which will make the refining procedure truly scientific and, in a way, automatic. This in itself is an important transformation in metallurgy.

It is interesting to cite some results obtained recently at the Ugine steel mills. The steels so produced are very uniform and the operators are able to procure at will any grain size, any extent or depth of temper, and other mechanical characteristics which have been agreed upon for the gradation of steel. Thus by making one factor vary at a time, it is possible to study systematically the conditions which result in certain characteristics (such as the relation between longitudinal and transverse properties) or the means of avoiding certain defects.

But above all the procedure points toward a planned metallurgy in which formulas of manufacture established in advance permit the attainment of a desired result. Thus there is automatically achieved a uniformity in manufacture which up to now has been purely a tentative procedure dictated by the operating experience of the plant personnel. In the older rule-of-thumb procedure, the characteristics of the steel vary from heat to heat. Likewise it has previously been the custom in the making of quality steel to have the laboratory test each heat and by means of this test to determine the chemical and mechanical characteristics. With these data at hand, each particular heat was classified.

In short, there is now a definite attempt in this country to control the refining of steel not in the French sense of the term (that is, post-operative control by the elimination of products not satisfactory to the required results) but in the American sense of the term (that is, pre-operative control or direction defining in advance of the manufacturing operations, depending on the characteristics to be realized).

The scientific principles on which this new procedure is based lend themselves to wide generalizations and are applicable to non-ferrous metals in addition to steel and cast iron. The application of this procedure to all the varying differences of steel at the present time and to the diverse conditions characteristic of each country necessitates further research work in spite of the basic simplicity of the principle. It is desirable, therefore, that mills experimenting with these principles collaborate fully in order that their combined experiences can be put into general practice.

In addition to this improvement in refining of steel, there are other manufacturing and metallurgical activities which became prominent during the year. For instance, the extrusion of steel was inaugurated on a semimercial basis in this country. Likewise, the industrial role of grain size in steel become more fully appreciated, largely as the result of research instigated in the United States by F. Bain and others. Other notable investigations were the studies on the formation of snow flakes in steel (work of Professor Houdremont and his collaborators), the development of special cast irons, particularly those resistant to oxidation by heat (studies of Professor Thyssen and his collaborators), the degree of purity attained industrially in electrolytically refined aluminum and in magnesium refined by electrolysis or by sublimation (process of Professor Chaudron and his collaborators).

ALBERT PORTEVIN,
Paris, France.

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Columbium, a New Alloying Element

One of the outstanding developments in metallurgy during the past year has been the commercial application of columbium in the manufacture of stainless steel.

While 18 per cent chromium, 8 per cent nickel stainless steel has been widely used, it was found to have some drawbacks when welded and placed in certain kinds of service. Unfortunately it had the peculiar characteristic of corroding around the grain boundaries, in the presence of certain corroding media, after hav-

ing been subjected to the temperature range of 900 deg. to 1500 deg. F. This kind of failure has been referred to as intergranular corrosion.

Many theories have been advanced as to the exact cause of intergranular corrosion. The most commonly accepted one explains it as the precipitation of chromium carbides at the grain boundaries resulting in the impoverishment of chromium in the immediate areas surrounding the carbides, to the extent that there is insufficient chromium present to offset the attack by the corroding media. Regardless of the theories, it was found that this type of corrosion could be greatly minimized by reducing the carbon content of the steel or by fixing the carbon so that it could not combine actively with the chromium. Various strong carbide forming elements were used experimentally to overcome this trouble but none seemed to entirely eliminate intergranular corrosion.

As a result of extensive research work, the Union Carbide and Carbon Research Laboratories discovered that the element columbium was very effective in overcoming intergranular corrosion. After proving the efficiency of this element in stainless steel, when subjected to the many combinations of heat treatment and corroding media which might be encountered in practical service, their findings were converted to commercial use.

In the beginning columbium was not available in sufficiently large quantities to permit its general application and it was recommended only where its use was considered essential. It was first used commercially as an alloy addition to welding rods since there is practically no loss of columbium in the deposited weld metal. An adequate supply of columbium has now become available and it is being used commercially in both welding rods and the base metal of equipment

W. J. PRIESTLEY

subject to intergranular corrosion.

The amount of columbium added to 18 per cent chromium, 8 per cent nickel stainless steel is determined by the carbon content of the steel. With a given carbon content, the quantity added depends on the service for which the steel is intended. If the steel, in service, is exposed to temperatures of less than 300 deg. F., the columbium content in the finished steel should be at least six times the carbon content. Where the steel is subject to temperatures in excess of 300 deg. F., the columbium content should be ten times the carbon content. With these amounts of columbium in the steel it is not necessary to anneal fabricated structures insofar as obtaining freedom from intergranular corrosion is concerned.

The fabrication of plain chromium stainless steels has presented many problems because of their air hardening characteristics. Here again we have the question of controlling the effect of the carbon present in the steel. Results obtained to date indicate that columbium can be used effectively for modifying many of the precautions generally necessary when hot working and fabricating chromium steels of the air hardening type.

The effect of columbium in 4 to 6 per cent chromium steel looks most promising since it not only reduces the air hardening characteristics and thus facilitates fabrication, but also improves resistance to oxidation at elevated temperatures. It produces physical properties similar to those of an annealed steel, apparently without loss in creep strength.

The notable effect of columbium on the carbon constituent of steel leads us to expect that this element may also prove to be valuable in obtaining desirable properties in other grades of steel.

W. J. PRIESTLEY,
Vice-President,
Electro Metallurgical Co.

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Convection Heating for Tempering and Drawing

I believe that one of the most important developments in heat treating equipment during the past year has been the application of convection heating for tempering or drawing.

Tempering and temperature are so closely related that even the words

ADAM M. STEEVER

are similar. No operation in heat treating requires so close a control as tempering and no operation is so difficult to control.

Convection heating consists of transferring heat units by means of gas, usually air, from the heating medium to the material to be heated. Any interference with the movement of the air or gas interferes with the heating. No convection heat whatever will penetrate through a solid, whereas radiant heat penetrates with comparative ease by conduction through the solid and radiation again from the opposite surface.

A simple comparison between the two types of heating is to say that convection heat follows the laws of air flow, radiant heat follows the laws of light—it can be focused, reflected and will travel through vacuum.

Obviously, therefore, tempering equipment has been designed with one important factor in mind. That is, uniform heating will occur where uniform air flow is obtained, and rapid heating will occur where large amounts of air are passing the material to be heated at a rapid rate.

ADAM M. STEEVER,
Technical Director,
Lindberg Steel Treating Co.

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Metallurgical Achievements in 1935

Undoubtedly the development of large unit (5 ton) capacity high frequency furnaces is an outstanding 1935 development in steel making. Our experience with such a plant is that alloy steels for aircraft and automobile construction of outstanding quality as regards cleanliness and mechanical properties can be produced. The day when the high frequency furnace was regarded merely as an economic and advantageous substitute for the crucible melting process in the manufacture of tool steel is definitely past. Such a plant also has obvious advantages in the manufacture of stainless steel with particular reference to the conservation of alloys and the production of very low carbon material where desired.

It is interesting to note that, after a long period, during which it was fashionable to regard the Bessemer process as dead in this country, it is now being established with great success. The acid

Bessemer plant at Workington, England (the only plant of its kind in the country), has been entirely reconstructed and is operating to capacity. The new plant constructed at Corby by Messrs, Stewarts & Lloyds, is producing basic Bessemer steel which had not previously been made in this country for many years.

As a significant metallurgical innovation of 1935, I would like to mention our collaboration with the Bureau of Standards in the determination of oxide inclusions in a series of specimens. These specimens have been distributed to a large number of laboratories throughout the world. It is regrettable that some of the samples are of a somewhat variable character, but nevertheless the coordinated results will be of considerable value. There has been a specific advancement in this country during the past 12 months on the subject of oxide determinations. We, as an industrial research laboratory, have operated the iodine extraction method for some considerable time and have also installed a vacuum fusion equipment. The work done here by the National Physical Laboratory and the Sheffield University is highly appreciated. There is little doubt that, arising out of the researches published in the recent Sixth Report of the Iron and Steel Institute, Ingots Committee, further attention will also be paid to the influence of gases other than oxygen in the near future.

In our own works, extensive research has also been made into non-metallic inclusions by microscopic examination and a system of inclusion counting is in regular practice. Complete details were published in *Metallurgia*, Vol. 12, No. 69, July 1935, by Mr. G. R. Bolsover.

Grain size control, the basis of which was laid by Herty, is recognized to be of great importance and is in regular commercial use in our plants.

T. SWINDEN

A matter of outstanding importance emanates from the work carried out in America by Russell and Franks on the de-activation of carbon by columbium, following the known effects of titanium in this direction. This work will no doubt have widespread importance.

In the field of physical properties, intensive research continues to be done on the properties of steel at high temperatures and attention is directed to the recently published researches of the National Physical Laboratory. It is important to note the investigation into the deterioration of molybdenum steels under conditions of critical stress and temperature, and fundamental investigation continues to be done in explanation of this phenomenon.

Increased attention is being paid to the subject of notch sensitivity and the damping capacity of various metals to vibrational stresses. It is felt that this constitutes a very important aspect on failures and when more completely understood, will no doubt lead to a revised conception of the desirable properties in steel according to the service conditions of stress which the particular mechanism is called upon to withstand.

T. SWINDEN,
Director of Research, The United Steel Companies, Ltd., Sheffield, England.

New Alloys, New Processes

There have been so many technical developments during the past year that to recount even all of the important ones would require considerable space. Probably no two men in the metallurgical field will agree on which developments are of the most importance. Probably no single man is acquainted with all of these important developments. In fact, many developments are still being carefully guarded as confidential. In the writer's opinion, some nine outstanding accomplishments are of especial merit and will be briefly described below.

In the non-ferrous field, the development of cadmium alloy bearings is a significant innovation. The development of cadmium nickel and of cadmium silver alloys as bearing metals for use in place of the time honored babbitts is often looked upon as the result of attempts to find a substitute for tin, which is not native to this country and the price of which is rather high. To some extent this may be true, but the substitute chosen for tin was in itself more expensive than tin and produced in this country to so limited an extent that its price has already risen over 50 per cent, largely due to this new use for it. Cadmium has been somewhat of a nuisance metal. As an impurity in zinc ores, it had to be removed and thus was a by-product of little value. Some years ago, plating for corrosion protection was developed and thus a certain limited market found for cadmium. Also cadmium additions to copper for high conductivity purposes offered some use for the metal. Limited amounts were also used in certain fusible alloys and solders. Suddenly a new use is found, namely it became the main constituent of bearing alloys. Two types of alloys are developed, one with nickel and one with silver as the main alloying constituents. Tests show the new alloys are not just substitutes for the old tin base babbitts but for heavy service are superior to it. Several automobile companies have already adopted the new alloys and a shortage of cadmium metal has developed. Its price has skyrocketed. Platers are already planning on swinging to bright zinc plating when cadmium is no longer available, and are advising their customers to do similarly. Will new production of cadmium develop to supply the market?

SAM TOUR

Continuous rod and tube casting has been another process engaging considerable attention in 1935. A development of two or three years ago in the non-ferrous field was the continuous casting of sheet and strip. A logical step from this is the continuous casting of rod and tube. In this case, however, the use of rolls is impossible. The rod is drawn from a pot of molten metal through an orifice of proper size and construction at a speed in accordance with the freezing rate of the metal as it passes from the molten bath into and through the orifice. By the insertion of a plug, held concentrically in the orifice, tubing is produced instead of solid rods. Sizes from ¼ in. diameter to 1½ in. diameter in copper and copper alloys and in aluminum have already been produced. The further

development of this process on a commercial scale will have a profound effect on many rod and tube mills.

Bright nickel plating also came to the fore in 1935. Bright nickel plating has been an ambition of electroplaters for many years. Many have been the claims of inventors along this line. In general, the method has been to add some special reagent to the plating bath to control the plate in some mysterious way. The ways have usually been so mysterious that even the inventors could not understand them. The plating baths would work for a time and then suddenly "go off." The amount (thickness) of plate that could be deposited and still maintain the desired brightness was limited. Now a real new bright nickel plating has been developed. Instead of plating pure nickel, an alloy of nickel and cobalt is plated. The plate is inherently bright irrespective of the base metal condition. A poorly polished surface or even a scratch brushed surface will end up bright if a sufficient quantity of this new plate is applied. Numerous large commercial installations are being made. No doubt many more will be made in the future.

In the ferrous fields, aluminum coated steel has attracted considerable interest. Aluminum coating of steel by the calorizing process both by dipping and by treatment in a hydrogen atmosphere with mixtures of powdered aluminum and aluminum oxide was developed some years ago. The aluminum coatings so produced were rough, somewhat brittle, and of considerable thickness. During the past year, a method of coating sheet and strip steel with a thin layer of aluminum has been developed. The layer is smooth, ductile, of controllable thickness, and surprisingly free of pin holes. Aluminum protects steel from atmospheric corrosion, from rusting in salt water and in many other commonly occurring types of corrosion. As this new product aluminum coated steel becomes commercially available, many uses will be found for it.

The year 1935 has witnessed additional developments of heat resisting alloys. Heat resisting alloys for electrical heating purposes have in the past been limited to operating temperatures of 2100 to 2200 deg. F. Many have been the demands for something that would stand up at 2400 to 2500 deg. The past year has seen such an alloy developed and several producers are now engaged in its manufacture and sale. The field of electric furnaces of the metallic resistor type has thus been very materially extended.

Copper chromium cast iron has been studied more thoroughly during 1935. Alloy cast irons are not new. Many types of alloys are in daily production. Copper additions to cast iron have been experimented with for years, but only on a small scale. During the past year the quantity production on a practical commercial basis of cast iron containing copper and chromium as the principal alloying agents has proved that this type of cast iron can be made uniform and economically. By varying the proportions of copper and chromium the resulting iron can be made to have almost any desired degree of hardness or depth of chill.

In the equipment field, centrifugal sand blast equipment was a major 1935 development. Thousands of plants in the metal working industry use sand blasting equipment for the cleaning of metals. The vast majority of these installations use a blast of high pressure air to blow the sand or grit against the article being cleaned. Naturally this air as it comes out of the sand blast equipment carries with it large quantities of dust. The continued drive against dust in industry made it necessary to either eliminate this source of dust or install expensive dust collecting systems. New sand blast equipment based upon the use of centrifugal force to create the blast of sand or grit instead of an air blast for this purpose has been a welcome forward step. Several such types of equipment are now available to industry.

Tube reducing is a process which is becoming increasingly important. The tube manufacturing industry has for years had available several different methods of initially forming the blank to be drawn into the final size required. Further reduction of this blank has been necessarily limited to the only process available which consisted of drawing through standard drawing dies. The development of a rolling method of tube reducing which permits of much greater reduction per pass and much higher speeds of production was, therefore, highly desirable. This method has now been thoroughly developed and a number of machines are in commercial use and will probably have a great effect upon the future of the tube industry.

A new type of welding timer was offered to the trade in 1935. Spot welding as a means of assembling has been in practical operation for many years. During recent years, the operators in this field have realized more and more the necessity for very accurate control of the time during which the current is allowed to flow between the contact point and the pieces being welded. A number of complicated electrical circuits have been devised and have been available for this control of time. These time controllers have, however, all been very complicated and expensive pieces of equipment. During the past year, a very simplified welding timer has been brought out which is not only much simpler but much sturdier and much more economical than those previously available. This timer will control the time accurately down to one cycle of current on a standard sixty cycle A. C. line. This development should be of material assistance to many plants now doing spot welding and should make possible the extension of the various applications of spot welding into new fields.

SAM TOUR,
Vice-President,
Lucius Pitkin, Inc.,
Consulting Chemist,
Metallurgist and Engineer.

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High-Strength Low-Alloy Steels

An important 1935 achievement in the iron and steel industry was the commercial development of high-strength, low-alloy steels. Although this development can by no means be credited to the past year, yet, during 1935, the commercial use of this new type of steel on a fairly large scale, especially in sheet and plate, established it as a satisfactory commercial article, and several new alloy compositions were developed and demonstrated as commercially satisfactory. It is to the credit of the executives in the steel industry that they recognized the need for lighter weight, stronger steels and were willing to invest large sums of money for research and promotional work.

The production of a steel of 50 to 100 per cent higher yield strength with good formability, weldability and greatly increased corrosion resistance at an increased cost due to alloy additions of from only $10 to $20 a ton is an accomplishment of which the metallurgist may well be proud. A score of different compositions of these steels are either being marketed or undergoing extensive experimental development. Undoubtedly, as experience is gained, these, by a process of elimination, will be reduced to only a few compositions, with each having certain advantages to fulfill specific

requirements. For the first time, as much attention has been paid to the effects of small amounts of alloys, and to the cheaper ones as to the effects of large amounts of alloys and to the more expensive ones.

Combinations of alloying agents have been chosen to give high yield strength with increased corrosion resistance without too much sacrifice in ductility, impact properties, and weldability. In many instances, the carbon content has been kept low, around 0.1 per cent, although in others it is as high as 0.20 to 0.30 per cent. The following are examples of some compositions now being made: U. S. Steels' "Cor-ten" contains approximately 0.1 per cent carbon, 0.50 to 1.00 per cent silicon, 0.30 to 0.50 per cent copper, 0.50 to 1.50 per cent chromium, 0.10 to 0.20 per cent phosphorus. Republic's "Double-Strength" contains less than 0.1 per cent carbon, 1.25 to 1.50 per cent copper, about 0.75 per cent nickel and

CLYDE E. WILLIAMS

0.11 to 0.16 per cent molybdenum. Inland's "Hi-Steel" contains 0.1 per cent carbon, 1 per cent copper, 0.5 per cent nickel and 0.1 per cent phosphorus. Youngstown's "Yoloy" contains about 0.1 per cent carbon, 2 per cent nickel, and 1 per cent copper. Alan Woods' steel contains about 0.25 per cent carbon, 0.45 per cent copper and 0.10 per cent phosphorus. One grade of "Chromsal" contains 0.14 per cent carbon, 0.75 per cent silicon, 1.20 per cent manganese, 0.50 per cent chromium, and 0.50 per cent copper. The English "Chromador" contains about 0.25 per cent carbon, 0.30 per cent copper and 0.95 per cent chromium, and the German "Union Baustahl" contains 0.15 per cent carbon, 0.60 per cent copper, 0.60 per cent silicon, and 0.50 per cent chromium.

It is noteworthy that copper is contained in all of these steels. In the lower contents, copper is used solely for improved corrosion resistance, whereas in the higher contents it provides still further increased corrosion resistance as well as the additional effect of increased yield strength with no deleterious effect on formability or weldability. Nickel is used in the higher copper steels to the extent of about one-half the copper content for the purpose of preventing surface checking of the steel during rolling. Phosphorus increases yield strength and, when used with copper, improves corrosion resistance to a marked degree. Further improvement in strength can be obtained in the 1 to 1.5 per cent copper steels by a simple heat treatment at 800 deg. to 1000 deg. F.

An important feature in these steels about which not enough is known is their corrosion resistance. Qualitative estimates have been made which still have to be corroborated or corected on the basis of quantitative information from service and simulated service tests.

The first major use of these steels has been in railroad cars and automobile trucks, where the reduction in weight with the resulting increase in payload should prove to be a self-liquidating investment. Undoubtedly, their use will be extended to heavier structures. The development of this type of steel may herald a new day for alloy steel.

CLYDE E. WILLIAMS,
Director, Battelle Memorial Institute, Columbus, Ohio.

Metals Manufacture Adds to Permanent Wealth of Nation, Dr. Finch Declares

THE perpetuating use of steel and non-ferrous metals was strikingly pointed out by Dr. John W. Finch, director of the Bureau of Mines, in a recent address. He said that the accrued value of steel and the chief non-ferrous metals that have entered as raw materials into permanent or recurring use in the United States since 1800 will aggregate in excess of $60,000,000,000 and that it would be safe to say that $50,000,000,000 worth of this is still in use.

Of the entire wealth of the United States, "conservatively valued in 1932 at more than $163,000,000,000," between 60 and 70 per cent had its origin in the mineral industries, according to Dr. Finch. Wealth won from nature by miners, he pointed out, does not vanish into thin air but endures and affords substantial additions to the nation's accumulating store of wealth.

"Except for the fuels, which like food are promptly destroyed by use, our metals and industrial minerals are transformed to an important extent into facilities—buildings, highways, bridges, railroads, power transmission and communication lines, water sewage and drainage systems—that render useful service year after year," said Dr. Finch. "Even the metals that go into relatively temporary uses, such as machine tools or utensils, after they have outlived their usefulness in factories, farms and homes, come back as scrap to be refabricated and used over again. This return of scrap iron, steel, lead and copper is one of the big problems confronting primary producers, but our revolving fund of metals is a national asset of no mean importance."

Supporting this point by estimating the accrued value of steel and the chief non-ferrous metals, Dr. Finch proceeded to say that for 10 years before the depression, the minerals produced in the United States were worth, on the average, $5,333,000,000 a year. Metals and other mineral products that contribute most to building up the permanent stock of durable goods were said to have represented nearly one-half of this total, with coal and petroleum products, the energizing elements of modern life, making up the remainder.

Value of Metals Greatly Enhanced by Fabrication

"Value figures for our mineral production, sizable though they are, as usually reported, fail utterly to reveal the real importance of minerals or the prominent parts they play in our industrial commerce," said Dr. Finch.

"Mine products are raw ma-

(CONCLUDED ON PAGE 77)

Standard Operation Record Card

MECHANICAL parts and sizes are standardized, a desirable result produced by the growth of interchangeable manufacturing. In the metal working industries there are indications of a parallel trend toward standardization of operating systems. This is notably evident in the many attempts to set up comprehensive records of the successive operations to be performed on parts.

It is unpleasantly true that some metal manufacturing plants, even those employing 100 or more operators, keep such records in a haphazard way. Sometimes the list of operations on such a common part as a small shaft, which requires cutting-off, turning, burring, drilling and milling, five distinct processes, may be loosely kept in any of the following ways:

(1) Handwritten on scraps of paper;
(2) Blueprinted lists;
(3) Mimeographed sheets, bound.

An experience of various troubles encountered with the methods mentioned has hammered out the conviction that if we exclude from consideration the rather elaborate addressograph plate and coded operation systems now being introduced, a simple file of typewritten or duplicated cards best meets the requirements of plants employing in the neighborhood of 300 operators.

Cards of all shapes and sizes have been used. Early attempts resulted in a little blue-lined ticket about twice the size of a calling card. Operations were written in by hand. As piece-work developed, the time study people clamored for space to put the rates opposite the corresponding operations, and then the tool engineer and purchasing people demanded that their wants be attended to, and the card grew, and its reverse side came into use.

As the result of an opportunity to revamp all records in a plant employing 200 operators, there was brought into successful use, the form of card, shown in the accompanying illustrations. It is not by any means claimed to be an absolutely original development, but it does present some novel and valuable features, and is unique in that its design and adoption were not hampered by any need to tie in with existing records as to size or get-up. If not a new thing, it is a new combination of proven ideals.

The man who installed it found as a first trouble that people were calling it all sorts of names, such as work card, route card, operation card. As a getaway from all such, and to tie in with production and purchasing control as well as the shop men, he dubbed it "planning record."

Mechanical Details

The card is five by eight inches in size and is printed on heavy stock, surfaced to take either pencil, pen, typewriter or duplicator records, and stiff enough to prevent the edges becoming dogs'-eared. It is convenient to remember that about 100 such cards are one inch in thickness, hence the capacity of files and cabinets may be readily gauged.

Another item of importance is the spacing of the lines. These are such that the ordinary double spacing of a typewriter will place the next line squarely in its space, and there is no overrun at the bottom of the card.

The card is printed in the so-called "tumble" style. If held in the hand in normal position and turned over toward the reader, as is the natural way, the other side comes into correct position for reading.

If suitable card stock is provided, one clear copy may be obtained in an ordinary typewriter, provided a non-smudging carbon paper is used. Special typewriters will give more copies. In most cases, several copies will be required. That leaves it up to the installer of the system as to whether he uses the duplicator or has the extra copies typed. An ordinary good typist can type at least 300 of these cards per day, if the material from which they are typed is clear.

The type chosen is simple and easily read, and it is well to insist on this point as an ornate type face looks out of place on a manufacturing record.

Such printed cards will not cost more than $6 per M. depending of course on the quantity required.

Use of the Front Side

Sometimes there are so many operations on the part that more than one card is required. Hence the notation in the upper right corner on the front of the card. The "Department Number" column is self-explanatory. The column "Station Number" is for use by production control and implies that each machine in the plant is numbered. The operation numbers run consecutively for each part. Operation descriptions are not necessarily confined to one line. A code may, of course, be used. The "Price per M." column is also self-explanatory. The next column, "Price Revision," is necessary to take care of changes in piece-work prices. A few months' use without the column shows so many ink alterations that many cards become illegible.

The date set down is the day on which the original price is set.

Lowers Production Costs

By J. D. RELYEA

"S.U." in the next column stands for set-up prices, if these are time-studied. Tool or pattern number is recorded in the next column. It is desirable that these numbers coincide with the part numbers, but in many cases this cannot be arranged.

Part Number	Name
Material specification	
Purchasing or special instruction	
Material quantity per M. pieces	
Product used on and number required	
Production time required	
Planning changes	
Card distribution	Payroll and Cost, Manufacturing Control and Time Study, Departments Concerned. This copy to
Signature & date	

Front of record card provides data concerning requirements.

The back of the card is used jointly by engineering, operating, production and purchasing departments. Material specification is probably laid down by the engineers, and this information also serves operating men and inspectors as means of a check-up.

Purchasing department are also interested in the quantity requirements per M. pieces. Quantity shown should include natural scrap.

Keeping Track of the Cards

Production control ties in with the above and find the information contained in the space, "Product used on," and "Production Time Required" a vital necessity in setting up their schedules.

It is well worth while to mark each card with the file to which it belongs, as they are often abstracted, and where there are several taken out for price checking, etc., this little point saves a great deal of time.

One or more signatures may be required on the card. In some cases, design engineering department, tool engineer, time study and purchasing department all append initials to at least one copy of the card to show that they have passed the information contained thereon.

Part Number	Name	Number of cards / This card is number						
Dept. No.	Store. No.	Opn. No.	Operation Description	Price per M.	Price Rev.	Date	S.U.	Tool or Pattern

On the back of the card are spaces for shop records.

The card will be found to be the fundamental record of operations, piece-work prices and material specification. It will be found necessary, if installing such a system, to centralize the responsibility for getting out the cards, and to make rigid rules as to checking the information obtained from various sources. When set up and in use, this type of card is a vast relief from the old bound volumes and scraps of paper.

If a file is placed in the shop it should be placed under the care of the foreman's clerk, otherwise oily fingers smudge the cards hopelessly.

A production planner, having set up his schedules, may merely pass a list to his clerk, who takes off material quantities from the cards. The foreman has no option as to required operations, for there they are specified on the card, and anything else is a waste ticket job. The time study man has a ready reference as to similar jobs and prices, and his use of such a card file generally results in graphs, with more production of time studies. The clear set-up of operations is a joy to the tool engineer and methods man.

An Up-to-Date Foundry Layout

By A. B. JACOBUS
General Manager, E. and T. Fairbanks & Co.

THE foundry of the Fairbanks scale works in St. Johnsbury, Vt., has been kept up-to-date by adding modern equipment as it has become available and changing the layout from time to time so as to be as efficient as practicable with relation to the new machinery. The result is that at present at one point, at least, eight men do the work which formerly required forty and great reductions in costs over only a very short time have been realized throughout this department. In fact with the new arrangements about 50 workers have been eliminated.

Great Savings Effected

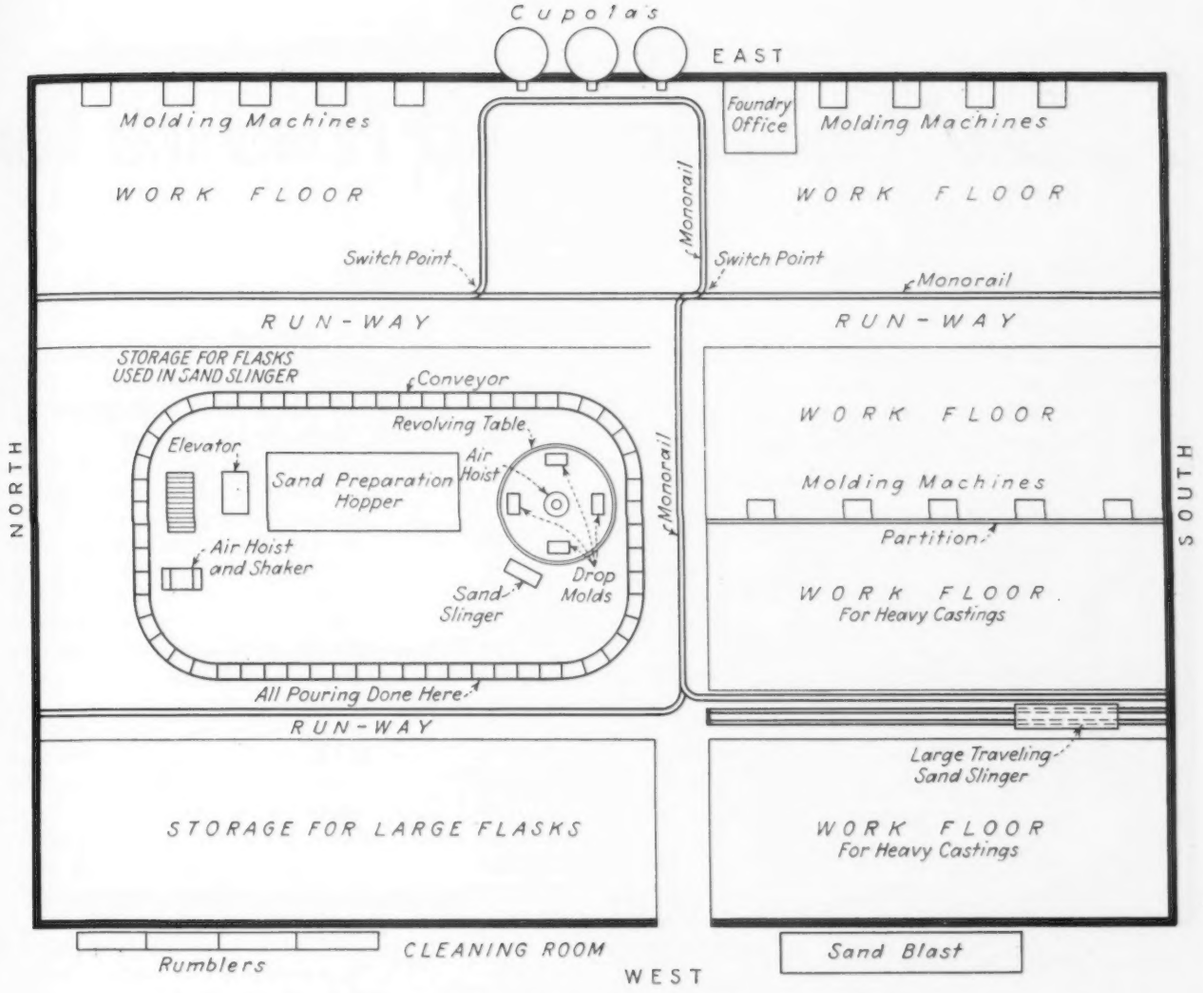
The part where the greatest savings have been made is in the production of castings for the bases of portable scales, of which large quantities are manufactured and where, consequently, quantity production methods may be employed to great advantage. Five hundred castings are made here per day under normal conditions. The arrangement is shown in the diagram on the following page. The equipment consists of a rotary table with sand slinger, drop molds and air hoist, at the molding position.

From the picture it will be seen that empty flasks are delivered on the gravity roller conveyor. The completed molds are placed on the power driven portion of the conveyor by the air hoist and are carried around a turn to the left where the pouring takes place as the molds move along slowly on the conveyor. The ladles for pouring are suspended from an overhead monorail coming directly from the cupolas. By the time that the molds have reached the other end of the conveyor the castings are cool enough to be removed. They are then picked up by the air hoist shaker, the castings are placed on skid platforms, the empty flasks are placed back on the conveyor to be returned to the molding position, and the sand drops into a pit where it is taken by elevator to bins for storage, wetting and eventual return to the sand slinger by mechanical means. It will be seen from the diagram that storage space for accumulations of empty flasks is provided for adjacent to the conveyor. The equipment, of course, is all standard machinery and it is by using it as outlined that the number of operators required for the day's production has been reduced from forty to eight.

For the molding of parts in lesser quantities there are thirty molding machines and fifteen squeezers, a large portable sand slinger operating on tracks adjacent to the large molding pits and a sand cutter operated by one man. The molten metal is delivered to strategic points by ladles on the overhead monorail system, where the molds are accumulated for pouring.

Both Light and Heavy Castings Produced

It is to be noted that a great variety of castings from small to very large are made in this foundry so that if such careful attention had not been given to the layout and the use of labor saving machinery decided inefficiencies would result. Thus it will be seen from the diagram that the pits for the large castings are reached directly by the overhead monorail and the tracks for the sand slinger and the aisles are arranged so that transportation by means of industrial power trucks is made easy and



This layout permits the efficient manufacture of light and heavy castings.

convenient. It is also interesting to bear in mind that this plant was started over a hundred years ago on its present site and that it has grown step by step and been managed so that it has always been kept up-to-date and efficient.

Accuracy Essential

Another point is that in the making of scales great accuracy is necessary both as to the dimensions and the composition of the parts. For this reason the metal is tested before pouring in the laboratory every day in order to make sure of maintaining the standard grade of iron. Proper metal is essential to accuracy in weighing for if it is not right the parts are liable to bend and lead to inaccuracies in the results given by the finished product. In other words scales are essentially instruments and must be treated as such in their manufacture.

The routine of operations in the foundry is about as follows:

As the castings are taken from the flasks the molder places them on skids preparatory for removal to the cleaning room. The gasoline lift truck then comes along and carries the loaded skids either to the sand blast or rumbler, depending upon their size. As each loaded skid is moved it is replaced by an empty one, thus eliminating extra handling. With this arrangement one gasoline truck can handle all the castings after each heat, thus facilitating delivery to the rough storage stock room.

The continuous pouring system is used throughout the foundry. Pouring commences at about 9 a. m. and continues until about 4 p. m., after which all sprues are removed from the floor. The electrical sand cutter then comes along and the sand is cut and piled ready for the next day's work. The large traveling sand slinger is used to fill the large flasks and eliminates 95 per cent of the manual labor.

Non-Ferrous Castings Also Produced

Brass and aluminum castings are made in another foundry adjacent to the large iron foundry. This foundry is also equipped with the latest melting devices, consisting of rotary furnaces for both brass and aluminum. These furnaces are equipped with the latest electrical heat controls, making it possible to maintain the same heat for all charges which is a very important factor here. The core room is also located in this building where cores are made in large quantities for both foundries.

Tool Equipment and Machine Parts

By P. H. DANLY

Danly Machine Specialties, Inc., Chicago

INTERESTING applications of torch cutting and welding in the fabrication of die sets and other tooling equipment and in the making of machine parts are described by Mr. Danly in this article, abstracted from his paper before the recent fall meeting of the American Welding Society. Use of steel castings are held to be highly advisable for certain purposes, and one of the greatest benefits of welded fabrication is that it enables building such castings into the new type of construction. Mr. Danly also points out that experience and skill are essential to success in applying the torch cut and weld method of fabrication.

ANY man engaged in the interesting work of designing and building tool equipment is aware of the fact that he and his art, to a large degree, lead the way in this age of machine specialization.

The product of the tool engineer's creative ability in the form of tools, dies, jigs and fixtures is equally as specialized as the art itself. Tool equipment of this kind is almost always special purpose, usually produced in single units, or at most, low multiples.

With this background of technique and product it is only natural that the cutting torch rapidly assumed an important place in the picture. Of course, we all know that it owes a great deal of its importance to the fact that its use is a preliminary step in utilizing its closely related companion tool—the electric arc welder.

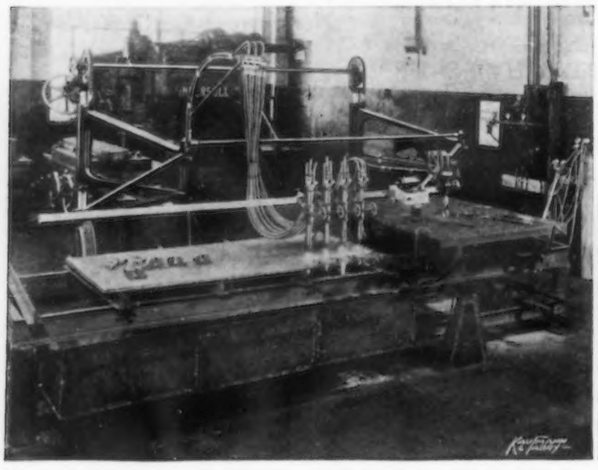
However, the cutting torch can stand on its own feet in pointing to five very important contributions it has made to modern fabricating procedure. These are:

1—It freed the designer from many limitations due to the material used and in some cases made possible types of construction that could never have been considered from a foundry standpoint.

2—Eliminated pattern costs, often as much on single run job as the cost of the part itself.

3—Reduced weight, always an important item in operating costs of parts moving under power.

4—Made freer experimenta-

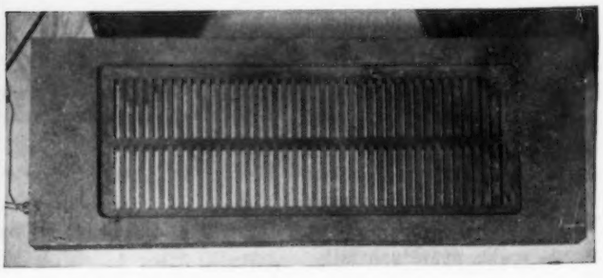


AT LEFT

FIG. 1—Torch cutting four small parts simultaneously from 1-in. steel plate.

BELOW

FIG. 2—The 82 slug relief slots of this die holder were torch cut from 2-in. plate without the faintest trace of notching. The slots are 7/16 in. wide by 6 in. long.



Built by Torch Cut and Weld Method

tion possible and made easier alterations in the equipment at any phase of the building at lower cost.

5—Produced greater rigidity, a prime requirement in any type of tooling, with less weight.

Necessary to Start from "Scratch"

Let us now consider the problems in designing for use of rolled steel as a material for tool equipment.

When designing for rolled steel, cautiousness due to the influence of previous experience with cast metals is more apt to restrict the possibilities of tooling built from this material than any limitations of the material itself.

The real improvements and economies of rolled steel construction do not become fully apparent unless the designer starts from "scratch" with a careful analysis of the functions of the tooling under consideration. While starting from "scratch" to design in a new and unfamiliar material obviously presents serious difficulties, the experiences of the last few years have made it increasingly clear that "cashing in" on all the possible benefits of rolled steel construction is an impossibility unless this "starting from scratch" procedure is followed.

Shapes Accurately Produced

We are all familiar with the oxygen cutting torch and the rapid increase of its use.

The torch, replacing some other form of machine cutting tool, travels along over plates of steel ranging from very thin sections up to thicknesses far beyond the possibilities of other cutting agents, simultaneously cutting a narrow slot or kerf through the plate. Its direction of travel is governed by the shape of the pattern or drawing on the machine. Almost any conceivable shape can be quickly cut from steel plate by this device and set-up.

In the hands of a skilled mechanic the torch cuts shapes from steel plate to such accuracy that in many cases they can be used without further machining.

Substantial economies can be ef-

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FIG. 3—Stripper plates and pressure pads for blanking and forming dies are torch cut and used with little or no machining.

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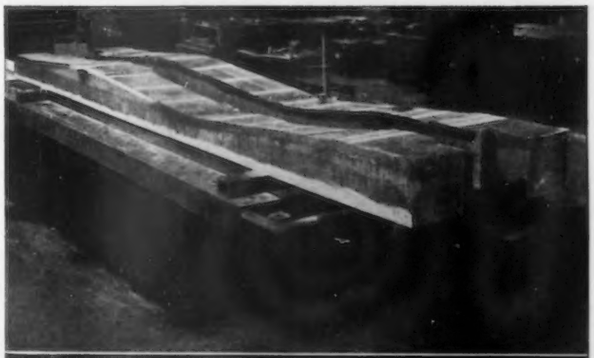

FIG. 5—In some cases the side rails of automobile frame dies require cutting through thicknesses up to 22 in.

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FIG. 4—Machine torch cutting in more than one plane.

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fected in the manufacture of tools because of this fact. For instance, in building tools for the metal stamping industry, die holders are sometimes required with so many slug relief slots that the thinness of section and the amount of coring involved make it impractical to cast them. In the past it has been necessary to machine these slots from a solid casting, a rather long and very costly operation.

Due to carefully acquired experience in applications of torch cutting these slots can now be cut by this method; shop time is reduced and a great saving in costs results.

Cuts 82 Slots in 2-In. Plate

An interesting example of this particular operation was a job having 82 of these slug relief slots 7/16 in. wide by 6 in. long on 1⅛ in. centers—cut from 2 in. plate. (Fig. 2) Skillful use of the torch made it possible to cut these slots rapidly and effect an amazing reduction in costs.

Additional emphasis on the speed of the cutting is appropriate here in view of the fact that the width of the slots is 7/16 of an inch, and they were cut accurately without the faintest trace of notching.

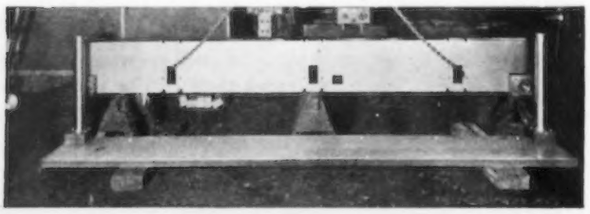

FIG. 6—This automotive frame die set, made by the torch cut and weld method, is 24 in. wide, 192 in. long and weighs 10,900 lb.

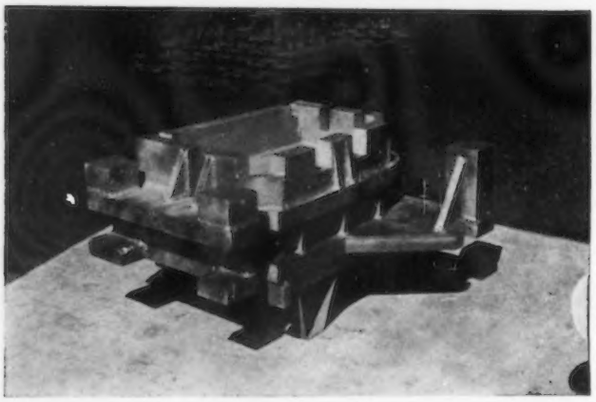

FIG. 7—A 4000 lb. die set illustrating unusual designs made possible by rolled steel construction.

FIG. 8—Another die set made of torch cut and welded rolled steel.

Of course, the ability to use the torch with such accuracy and to such advantage did not come overnight. It required intensive study and some dearly bought experience, but the fact remains that the savings—when made—were very real.

Another example of the savings resulting from machine torch cutting of tool equipment is furnished by the stripper plates and pressure pads used on blanking and forming dies. (Fig. 3) Formerly the manufacturer of these parts required a lot of time for layout, drilling, sawing, and filing to shape them to fit over the punch or in the die.

They can now be torch cut with such accuracy that they are used without further machining except for a small amount of planing or grinding on the flat surfaces; and even this operation can often be eliminated by the use of cold rolled steel.

Cuts Not Confined to One Plane

An illustration of the fact that machine torch cutting is not confined to cutting in one plane only is furnished by the cutting of pressure pads for automobile frame dies (Fig. 4).

In the plan view these parts are cut to the shape required by the double drop frame. They are then turned at 90 deg. The top face is then cut to the shape required by the frame at the point where it narrows down for the motor mounting, etc. This leaves the bottom face a straight line for bottoming on the die holder.

The side rails of these dies are cut in a similar manner (Fig. 5), in some cases through thicknesses up to 22 in. Extreme care and proper pressure control made it possible to make these heavy cuts without slowing up—at no time was there any delay due to "starving of the tip."

These parts were completely machined over all on a Keller die sinker and the time saved by not having to work through the sand and scale encountered on the surfaces of steel castings effected a great saving in cost on this job, in spite of the fact that in this particular case, the torch cut metal and the material required were equal in cost with steel castings.

Large Rolled Steel Die Sets

Another typical example of the advantages offered by this method of fabrication is furnished by the die set for automotive frames shown in Fig. 6. It is 24 in. wide and 192 in. long, and weighs 10,900 lb. Shoe thickness is 3 in. and holder 5½ in. The relief for bolt slots and the cut-outs in shoe and holder were torch cut so accurately that there was no need for further machining at these points.

An illustration of the unusual designs made possible by the rolled steel construction is furnished by the 4000-lb. die set shown in Figs. 7 and 8. Its construction illustrates

a point mentioned previously—the full benefits of the use of machine torch cutting do not become fully apparent unless it is used as a part of the electric arc welding method of fabrication.

Torch Cut and Weld Fabrication of Machine Parts

A discussion of machine torch cutting of tooling equipment naturally leads into the industry's sister art—the torch cut and weld fabrication of machine parts.

The advantages of this method are just as plainly apparent in building special machine parts as in building special tooling equipment; in fact, the theory of design and construction is practically identical.

Much of the same theory that applies to the design of tooling equipment from rolled steel also applies to machine parts built from this material. Again, the designer must start from "scratch," with a careful analysis of the machine and its component parts. However, one very decided advantage in new design is offered by rolled steel; it makes possible certain devices such as the box section which makes it easier to compute complicated stresses and to achieve the great rigidity so essential in machine construction, at the same time reducing weight.

In the construction of high production machinery—complicated as it is in design, construction, and operation — it can be positively stated that under such conditions, the machine can invariably be constructed at lower cost by the torch cut and weld method.

Another important advantage that this method brings to the building of special machinery is the great saving of time and money that it makes possible whenever it is found necessary to make changes and alterations in design and structure during the process of construction. Rolled steel and torch cutting and welding, therefore, make it easier to cut the cost of experimentation in new principles of design and construction.

Steel Castings Used With Rolled Steel

While naturally enthusiastic about the advantages of rolled steel construction by the torch cut and weld method, I am well aware of the fact that there can be no entirely satisfactory substitute for steel castings in certain applications in machinery building.

I consider it highly advisable to incorporate castings into rolled steel construction on certain jobs and for certain purposes; and I believe that one of the greatest benefits of the electric arc welding method of fabrication is the fact that it enables us to build steel castings into this new type of construction and thereby secure the benefits offered by both materials.

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FIG. 9 — Front-end bed section of a large planer-type milling machine. The bed is made of welded steel and weighs more than 27½ tons.

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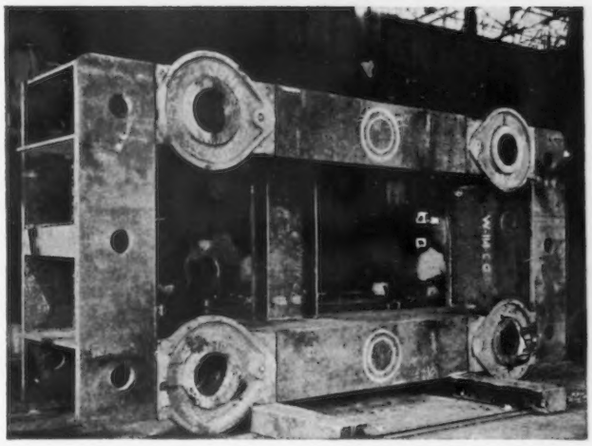

FIG. 10 — Press sub-bed having cast steel gear boxes welded into the steel plate main frame.

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An interesting example of this point is this press sub-bed shown in Fig. 10; cast steel gear boxes for the adjusting screws are welded with the main frame construction of steel plate.

Much progress has been made in machine tool construction during the past few years, and the industry deserves great credit for continuing its progress and development during the depression years and their almost complete stagnation. Credit is due to those men who have gone ahead unhampered by inhibitions resulting from previous experience and who are unafraid to ignore restrictive traditions. These facts are convincingly dramatized by the progress made in torch cutting and electric arc welding and its application in the machine tool industry during the past few years.

Experience and Skill Essential

In conclusion, it is necessary to point out that building machine parts or tooling equipment by the torch cut and weld method of fabrication—while presenting many and obvious opportunities for savings—also presents some difficulties, and they, unfortunately, are not so obvious.

Experience and skill are underrated factors in practically every line of endeavor and the welding business is no exception. Their sum total as applied to this field can be briefly defined, however. It consists of having the knowledge necessary to decide which job, or which part of which job, is suited to rolled steel construction; the ability to start the design from "scratch"; and the skill and facilities to put the job into production and carry it through with no doubts as to its successful outcome.

MORGAN FARRELL

The American System of Enterprise

First in a Series Recalling the Forgotten Principles of Democracy

o o o

By MORGAN FARRELL
Director, Chilton Bureau of Economic Research

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HALF-DROWNED by the flood of confused thinking, irresponsible utterance and mischievous activity, now overwhelming the world, even the patient and intelligent American Citizen has been driven of late to question the soundness of the institutions which have made his country great.

"Can these people be right?" he asks. "Is our splendid day of Empire-building over? Is it true that our system of enterprise could only work when we had a continent to develop? Must we now settle down to a bread-ticket existence—a life of standing in line, of hopeless self-denial?"

"Are these talkers right," he questions, "when they point abroad at the state of the world and tell us: 'You see what happened over there? Dictatorships in Spain, Germany, Italy, Russia, China, Greece? They had to come to it, because nations, from now on must be organized like armies, each commanded by a single head. Mankind must be handled in masses. The days of free-and-easy living are gone by—here as well as elsewhere. We must all come to the same military formation of trade regiments, industrial divisions, economic armies and march—march from the cradle to the grave. For your capitalistic system is dead.'"

That is what we hear on the street corners, in the college classrooms, in the very halls of the Government founded upon this American System of Enterprise. From the millions of Marxists, Leninites, Hitlerites and the rest rolls a thunder of assurance that capitalism has been slain and that Communism, the rule of the people, reigns in its stead. But even that is not enough. The whole world must be won over to the Third Internationale, or to Fascism, or to national Socialism, or what not—preferably by force.

Well, John Citizen could stand that without much emotion—he did not think a great deal of that crew, anyway—but, when the same doctrines now come to him through the voices of the leaders of his own people, he begins to take thought. "The old order changeth, yielding place to the new." Perhaps, without knowing it, we are already in the new order, an order of socialization of everything, principally wealth and property. If that is the case, he thinks, we may as well turn the direction of American affairs over to those who believe in this socialization—or whatever they call it.

Now, psychologists tell us that continuous dwelling in an atmosphere of muddled thinking, eventually dulls the reasoning faculties to such an extent that they are unable to recognize even the most elementary truths. This principle would account for the readiness with which the typical citizen accepts that pointing across the seas of the "look - what - happened - to-Europe" school.

Yet it is pitifully obvious that European nations have surrendered to dictators, not because they reasoned that the time had come to organize themselves into regiments to perform all the tasks of

life, but because they were in a state of revolution and utterly unable to reason about anything. Revolutions have almost always produced dictators. Almost. The American Revolution did not. The American mind does not work that way. It is too independent. It has a broad tolerance for the experiments of its duly elected representatives but once convinced of their ineptness, it rejects them and all their works, promptly and completely.

The United States came into being through this tolerant independence of thought. Through its driving power this nation has taken first place among the powers of the earth, and through its reinvigoration our people will continue to progress to higher standards of living than any yet established.

Let us see what we can find in the system by which this nation has grown great to warrant our faith in its power to perpetuate itself. Some call it the capitalistic system, but that does not describe it correctly, as we shall see. A more accurate designation is the American system of enterprise.

A definition of this system in terms of economics would be a bit too technical for present purposes. The essential motivation of the system, however, can be stated very briefly in single words: individualism, initiative, industry, independence. It is not without significance that they all begin with "I." Throughout our entire history the vigor, enterprise and resourcefulness of the ego has furnished the driving power toward a rapid but healthy national growth.

Thus the discoverers, who set out upon the stormy Atlantic in their frail barks bound for a wilderness of unknown terrors, were individualists of the first order. So were John Endicott, Roger Williams, Peter Minuit, Sir George Carteret, Lord Baltimore, Captain John Smith and George Oglethorpe, when they founded the string of tiny settlements, which grew up into the thirteen states. So were the people of the prairie-schooner caravans, winding their way into the West and of the raft-borne cabins, drifting down the Ohio and the Mississippi.

They were individualists by selective breeding. They had to be or they would never have left their European homes and security to face the task of cutting a meager living out of the plains and the forests of America. They had no one to depend upon but themselves. Their own acts and decisions alone determined whether they and their families would survive or perish in the long conflict with man and nature.

Perhaps never in modern history was there such a distinguished gathering of individualists as those fifty-six men who filed up to the rostrum in Carpenter's Hall on that July day in 1776, one by one, to put his head into a noose and his name upon the Declaration of Independence. And what is to be said of the rugged individualists who marched and countermarched in the heat and the snows of seven long years, to gain for themselves and hold for us the right to originate and carry on our private business without interference from Government?

Such is the ancestry of the American system of enterprise, which began to take form immediately after the Revolution and reached full growth with the coming of steam, a quarter-century later. The steam engine released more pent-up individualism for activity in all directions, than any other physical factor in the development of our system.

It started the inventors on their way to revolutionize completely the manner of living of the nation. These individualists mounted their steam-engines on wheels or set them up in boats, thereby inaugurating a new era in transportation. They connected up their engines to the unwieldy flour mills and crude spinning frames of the time, thereby setting in motion the machine age with its chain of industries extending back into the depths of the earth.

Nor were the inventors alone in their individualism. The railroaders, shipmasters, city-builders, machine-makers, manufacturers quickly saw the opportunity to adapt the new inventions to enterprises of their own—enterprises on an unprecedented scale of magnitude and cost which called for more money than inventors and promoters could scrape together between them. And here capital enters upon the scene in the shape of the bankers, who furnished the funds, usually their own, to launch the "Clermont," finance the Camden and Amboy railroad, or construct the cotton mills of Fall River. The system, from the beginning, was a necessary welding of commercial, inventive and financial enterprise, and so it has remained to this day. None of the three could go it alone and any two would have made slow progress without the third. Together they have placed the United States in the forefront of the nations of the world in industry, wealth and power. They have given to the people the highest standards of living and of independence of action in all history.

Now we are told that all this progress toward better living for all, together with the system, which brought it about, must be abandoned at once. The American system of enterprise, as we have known it, has outlived its usefulness, they say, and must be relegated to the dust-heap. It is not exactly clear what is to be substituted for it, by the incurably hopeful experimenters, who would, without further thought, cast aside a social, political and economic organization perfected by one hundred and fifty years of transcendent national genius.

Intelligent Americans have listened and looked on in wonderment as the false prophets who always spring up in the hours of great confusion and distress swayed millions by their unproven libels upon our established economic institutions. When their hold upon the credulous and unhappy masses could not be maintained by sheer abuse of the system they came forward with their schemes for dividing the wealth of the nation, for unearned old-age incomes, for regulating the banks out of existence.

The Longs, the Townsends, and the Coughlins have had their innings, but we still have with us a far more powerful party dedicated to the negation of the individualism which is America—more powerful because it is in possession of the official means to enforce its doctrines—nothing less than the executive and legislative sections of the Government itself.

We do not propose, here, to take part in a political controversy. It is not necessary. We have set out to show what the American system of enterprise is and why it will continue with renewed strength

(CONCLUDED ON PAGE 52)

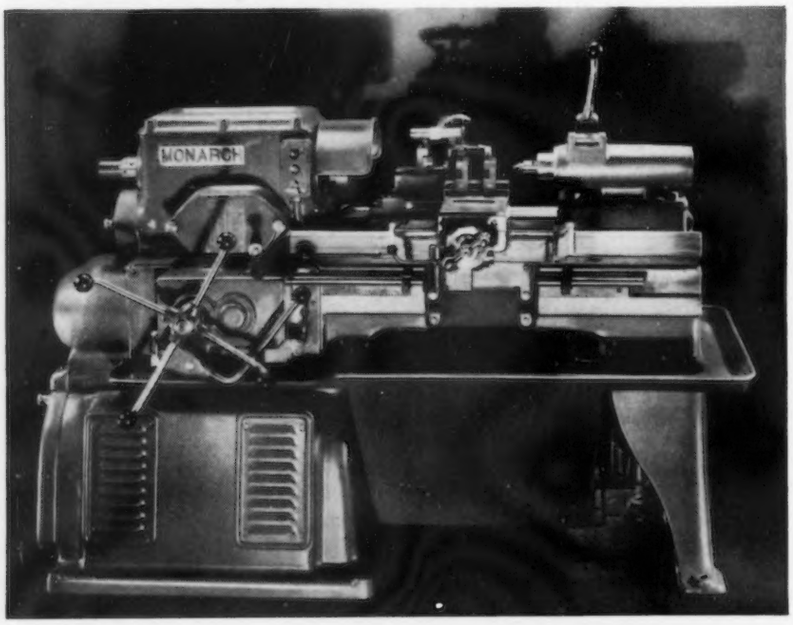
Improvements in Production

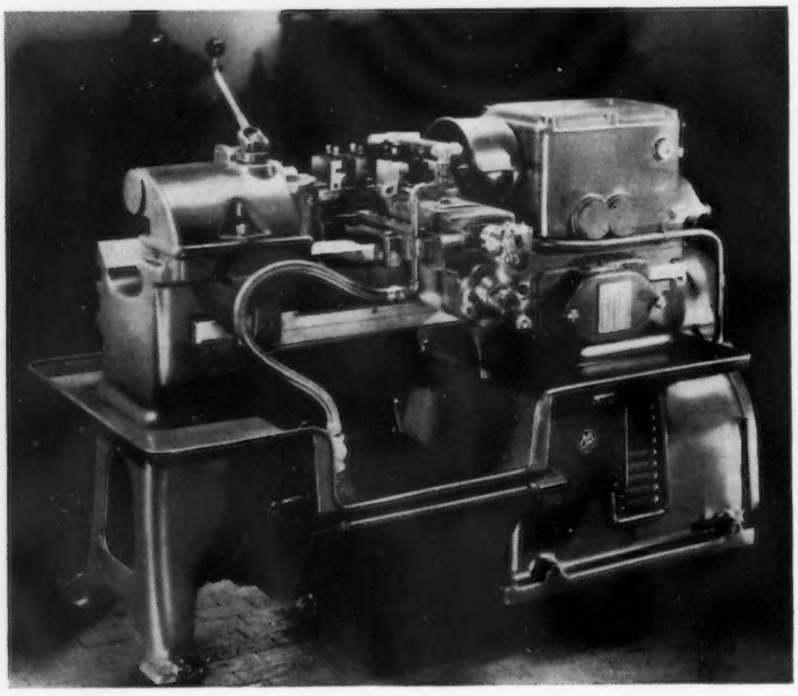
Wide Tooling and Speed Ranges Available in Semi-Automatic Lathe

A TWELVE-IN. type "T" double carriage semi-automatic lathe by the Monarch Machine Tool Co., Sidney, Ohio, was exhibited for the first time at the recent Cleveland machine tool show.

The machine is designed to handle the smaller classes of production jobs where a quick, convenient hand return to the tool slide is desirable. Automatic length feed stop is standard and so arranged that a very quick tool set-up for either single or multiple tool jobs can be made. Anti-friction bearings are employed throughout, and all the steel parts are heat treated and hardened. Spindle speeds are as high as 2000 r.p.m. for cemented carbide turning tools. A wide variety of single or multiple tooled manufacturing operations may be provided for in equipment selection.

Motor is mounted inside the cabinet leg; drive is by multiple V-belt. Convenient pick-off gears are provided to change spindle speeds and to change feeds on both the front and rear carriage. Swing over bedways is 12½ in., while the swing over the carriages is 7 in. Distance between centers can be 18-in. base length, 30-in. and 42-in. Net weight of the machine illustrated is 3400 lbs. The machine will accommodate the main drive motor up to 10 hp.





Developments in lathe design as utilized in semi-automatic production are illustrated at the left.

Mercury Vapor Lamp Auxiliary Transformers

THE requirement for an auxiliary transformer or reactor in connection with the use of mercury vapor lamps has resulted in the announcement, by the Jefferson Electric Co., Bellwood, Ill., of four distinct types or styles. Inclosed types include, indoor wall mounted, indoor suspension and weatherproof units. The same units are available in core and coil styles, withous inclosures. Snap-on, self-locking plug and jack connections provide for quick change of primary tap to match the voltage of the power supply line. Tools are not required in making the change.

o o o

and Shop Equipment . . .

Improved Lathe for Manufacturing Use

A HIGHLY developed engine lathe for manufacturing applications has been brought out by the Hendey Machine Co., Torrington, Conn. In addition to high-speed turning, this new lathe, the 4C, is also capable of a wide range of thread cutting; and for chucking work the spindle is bored to take a bar 1½ in. in diameter. Massive tailstock, equipped either with fixed or live center, the latter mounted in precision anti-friction bearings, is a feature.

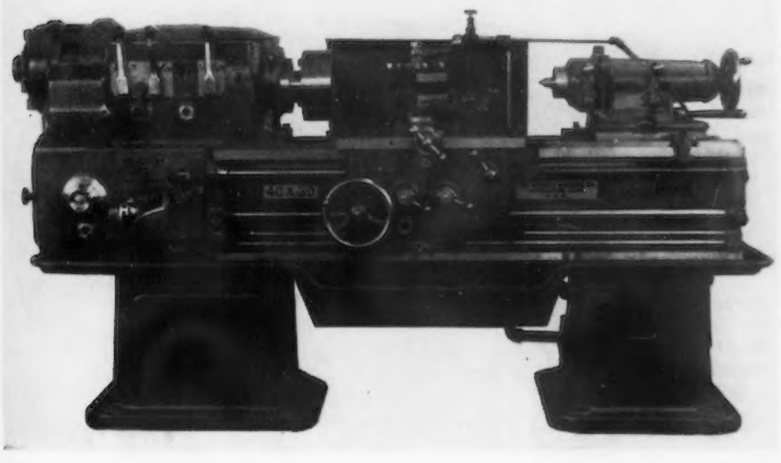
Spindle speeds, 12 in number, range from 30 to 1200 r.p.m. in geometric progression. Gears are oil hardened and slide on multiple-splined shafts for speed changes. The spindle runs in preloaded, precision anti-friction bearings. Anti-friction bearings are used also in the spindle speed change mechanism, and all gears, shafts and bearings are splash oiled.

The machine is powered by a 7½-hp. constant-speed reversing type motor flange bolted to the end of the headstock casting. The rotor shaft transmits motion to the power-input shaft of the head through a multiple-disk clutch running in oil. Start, stop and reverse push button control of the motor is provided.

The gear box has 28 changes of threads and feed with a range of 2¾ to 40 threads and feeds of 0.005 to 0.073 per in. The gear box mechanism is automatically oiled. The leadscrew is driven from the gear box through a positive tooth clutch, and the feed rod is driven through a safety-type slip clutch. When either one is running the other is disengaged.

The apron is a box-type one-piece casting. Cross and longitudinal feeds have positive clutch engagement with quick-acting lever controls. Apron, carriage and cross-slide are automatically oiled from an oil reservoir in the lower half of the apron, with sight gage to show oil level.

Optional equipment includes multiple-graduated dials on the cross-feed screw for repeated settings of tool for different diameters; motor-driven coolant supply with remote control switch; taper attachment; four-way tool block; rear tool block; multiple-feed stops; micrometer carriage stop; and thread chasing dial.

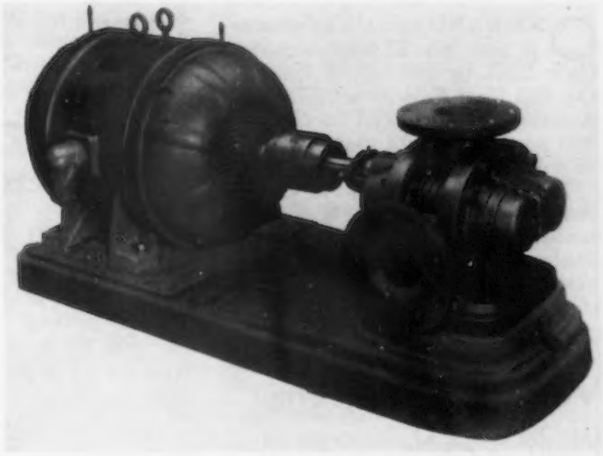


AT LEFT

High-speed turning, thread cutting and chucking are featured in this new lathe.

New Series Steel Mill Lubricating Pumps

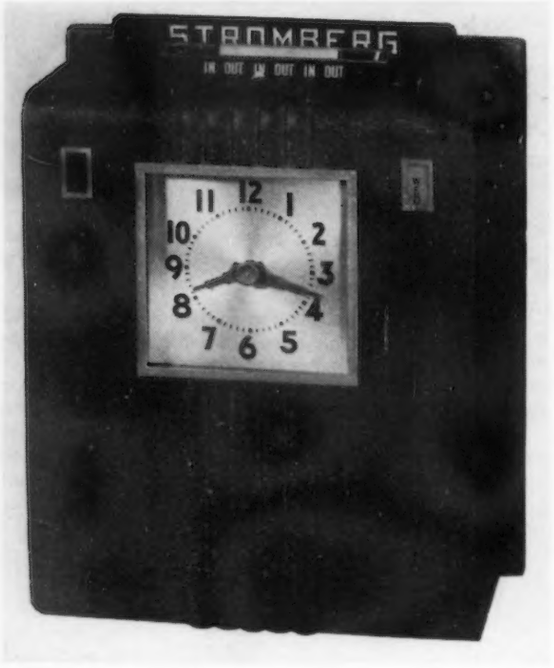
A NEW series of pumps by Geo. D. Roper Corpn., Rockford, Ill., features pump assemblies especially designed for steel mill lubricating systems but which may be used on any pressure lubricating system where pressures up to 100 lb. are required. Capacities range up to 700 gal. per min. and direct motor speeds range from 585 to 1140 r.p.m. Standard fitted pumps have all parts made of cast iron except the steel driver pumping gear and shafts. When bronze fittings are specified all parts are made of cast iron except the bronze pumping gears and the stainless steel shafts. When all bronze design is wanted, all parts coming in direct contact with the liquid are made of bronze except the stainless steel shafts.



AT RIGHT

Capacities range up to 700 gal. per min. in this new series of Roper pumps.

o o o



Small Time Clock Uses Standard Size Cards

ONE-HAND operation features a new No. 15 time recorder clock built by Stromberg Electric Co., 223 West Erie Street, Chicago. A telechron motor can be plugged into an electric light socket or may be used with a control clock.

The size of the recorder is less than one quarter that of former models. Full size standard time cards are used. The card is deposited face outward and printing is on the front of the card.

Ventilated Buffs Permit High Speeds

UTILIZATION of centrifugal force to draw in air and force it through and radially out of a buff in a cooling circulation features a new ventilated buff by the Jackson Buff Corpn., 21 Forty-first Avenue, Long Island City, N. Y.

A retaining steel ring is attached to the inner diameter of each component or "air-way" cloth disk member of the buff. A center plate, provided with circulation slots around its circumference inserts into the steel rings and permits that air shall circulate outwardly after having been drawn in through center plate and flanges. The end flanges serve to lock the component air-way disks together to form the buff. The material used is 84/92, unbleached sheeting, woven from extra tight twist thread, into a hard firm cloth. Only the bias of the cloth is presented to the work. It is said that speeds of 12,000 surface ft. per min. can be maintained without heating and that lack of heat assures that buffing compound will effectively remain on the buff. Stock sizes are from 6 to 20 in. by 2 in. increases. Center plates and flanges are provided to suit spindle diameters.

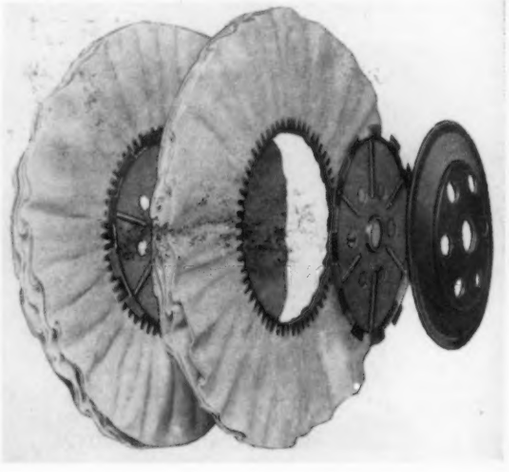
Thumb Pressure Flame Control in Welding

THUMB lever control without change of holding position, and gasaver shut-off in the handle are features of a welding torch announced by Weldit Acetylene Co., Detroit. Application or release of natural thumb pressure provides or shuts off the pre-adjusted flame. A pilot light eliminates unnecessary waste of gas. Length of hose in no way affects gas consumption as the shut off is located within 12 in. of the flame tip. The efficiency of the control is said to have been thoroughly demonstrated on a large number of production jobs through increased speed and gas saving.

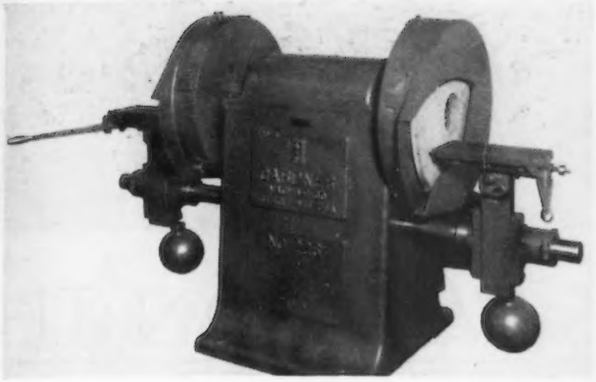
Above is a clear illustration of control simplicity and convenience in a welding torch.

Definite Betterments In Disk Grinder Line

A NEW "200 Series," single spindle disk grinder, by the Gardner Grinder Co., Beloit, Wis., provides added machine resistance to the stresses of hard work in direct proportion to abrasive developments which have increased wheel ability to do harder and faster work, with 1 in. or more of usable abrasive. A massive base is substituted for the former light base element; spindles are larger in all dimensions than has been common to older machines and pre-loaded oversize ball bearings are employed in spindle mountings. Wheel collars or flanges have been increased in diameter to one-half



Automatic cooling, by air circulation provided for in assembly design features new "ventilated buffs."



Single pass trimming of stampings is accomplished with this improved equipment.

the diameter of the disk wheel itself. Work tables present increased resistance to the vibrations set up by greater stock removal and rocker-shaft outboard floor supports are available for additional betterment, when operation is under conditions of heavy or varying duty.

New Design in File Tooth Construction

NEW files, in Nicholson, Black Diamond and McCaffrey brands, announced by Nicholson File Co., Providence, R. I., provide up to three times as many cutting edges to each square in. of the file's cutting surface as has been common to preceding models. It is said that the new design assures that the files do not skid or slide off the line of work.

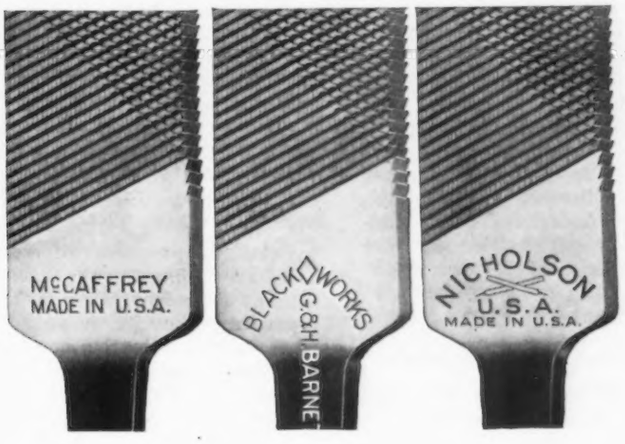
Construction is such that, as teeth wear down, reserve cutting edges take their place. Demonstrations and tests have been carried on for a considerable period of time in both the laboratory and under severe conditions of shop use. Patents are pending on method of manufacture and tooth construction.

Speed Reduction Unit For Laboratory Use

A SMALL a.c. motor equipped with gear reductions suitable for laboratory testing has been announced by A. G. Redmond Co., Flint, Mich. The motor, designed for 110-volt service, is wound to operate at various speeds at predetermined loads on a.c. or d.c. When employed for universal service the speed on d.c. is approximately 15 per cent faster than a.c. The design includes four shafts; Fast rotary, 56 r.p.m, oscillating 70 deg.; Slow rotary, 6 r.p.m., indexing 60 deg. Geneva motion is utilized in a six station index timed to stand still 3 sec. against 1 sec. of movement.

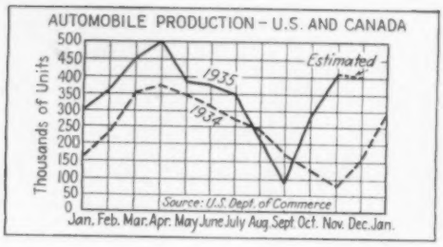
Improved Equipment for Stampings Trimming

THE illustration herewith is of development by the Quickwork Co., St. Marys, Ohio, on its line of stamping trimming machines. As shown, the equipment is for beading and trimming the flash from a stamping in one operation and at one pass of the stamping. All classes of stampings which are to be trimmed, beaded and flanged, in any combination, in one plane, and quite regardless of shape, are said to be within the capacity of the machine.



Improved Device for Barrel Stapling

THE improved "Staplit" machine, announced by E. H. Titchener & Co., Binghamton, N. Y., for barrel and keg heads, features a positive spring feed, capacity for 100 staples cemented together in blocks, a heavy steel body and an adjustable segment for steel or wood hoops. The salvage value of containers headed with the device is stressed by the makers.



THIS WEEK ON THE

Auto Production Declines As Uncertainty Develops

DETROIT, Jan. 14.

FROM a production standpoint, the position of the automobile industry can be gaged by a number of straws in the wind: Present daily or weekly volume; tentative schedules for the month or months ahead; commitments for raw materials; and bull statements by sales departments. What have the indicators shown in the past week?

In the first place, there was definitely shown a slight recession in current production. Ford slowed up somewhat. Plymouth maintained daily volume at peak for the motor line, but cut the work week from six days to five. Dodge also cut a day off its schedule. Cadillac cut from five to four days. Hudson is also said to have slowed down.

On the other hand, tentative schedules for the future are holding up well. Buick plans 15,000 units for January. Chevrolet is planning 110,000 units for January, 95,000 for February and 125,000 for March. It must be remembered that on the present five-day week there are only 20 working days in February. March will have 22. The rumor still persists that Ford will turn out 150,000 cars in February, but this figure is possible only if a six-day week is inaugurated. A 6000-car day is the present engine capacity of the Rouge plant, but today's production rate is said to be about 5200 cars and trucks a day.

Commitments ahead for the next quarter look very promising at this time. Volume of steel orders for delivery four to six weeks hence is holding up well compared with December volume, particularly among General Motor units. On the other hand, body stocks on hand are known to be high for at least one important builder, Briggs, and there have been some holdups on delivery reported in the past week at a few other plants.

Despite optimistic statements of sales managers released to the press in the last few days, there is a feeling of uncertainty, occasioned largely by the used car situation. As one realist put it: "The car builders will make what they can sell, and what they can't sell they won't make." Revisions in schedules, either way therefore, are expected at frequent intervals during the next two months.

Would Limit Highway Speed

Representative Robert Ramspeck, of Georgia, has carried out his threat of introducing a bill in the House limiting the speed of highway vehicles to 60 miles per hour. Earlier talk was about governing the speed to 50 miles per hour, so this is somewhat of a concession, but it is doubted that the manufacturers will take this bit of regimentation lying down. This is just a sample, however, of the sort of thing that will be wished on the industry unless some tangible gain is made in accident reduction.

Ford's $25-a-month idea of selling new cars has temporarily demoralized the used car market, at least locally. It is intimated that an important announcement regarding used car financing will be forthcoming from Dearborn in the immediate future. Incidentally, *Automotive Industries*' recent survey of 25 principal cities indicates an average rise of 50 per cent in used car stocks, the range being 20 to 300 per cent.

Ford's Steel Needs Uncertain

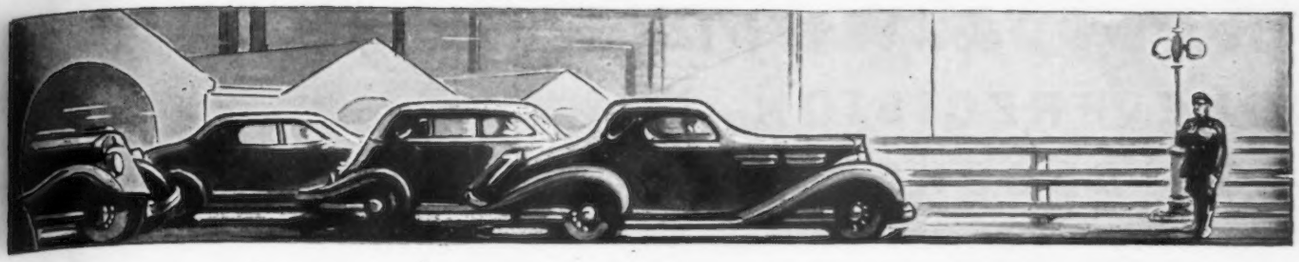
The completion of the 56-in. hot strip mill and cold finishing mills by the Ford Motor Co. has raised some doubts as to the future requirements of the company as to steel bought on the outside. Ford's present open-hearth capacity is approximately 50,000 tons a month, or 600,000 tons annually. This accounts for about half the total tonnage of rolled steel going into the V-eight in a year. Some extra metal must be introduced along the line, but whether it will be in the form of ingots, slabs, or hot-rolled sheets or in what quantities of each are open questions.

The new hot mill, which went into operation a few weeks ago, can produce strip up to 48 in. in width. In the cold-rolling section is a four-high 84-in. reversing mill for cold finishing wide sheets which necessarily will have to be purchased outside. There is also a three-stand tandem mill for finishing 48-in. strip. These cold finishing mills are not yet in full production, although they have been "turned over" on experimental runs.

Machinery Prospects Good

From all indications, January will probably prove to be a better than average month for machinery sales, considering that there is no buying activity related to 1937 models. Already, however, tentative proposals are being asked for, but these proposals will not develop into orders for months to come. They indicate, on the other hand, a very active year ahead.

Scattered programs of re-equipment are supporting the machinery market at present. Ford Motor Co. continues to buy for the valve plant at Northville. Pontiac has not yet closed on all machinery for the axle division at Pontiac. During the past week one of the biggest deals



ASSEMBLY LINE

By FRANK J. OLIVER
Detroit Editor, The Iron Age

in some years has been closed, covering purchases for the press lines at General Motors new stamping plant in Grand Rapids. Some of these presses are said to be the largest ever built, with beds 10 in. wider than on any previous equipment. These will fabricate "turret-top" roofs. Purchases of machine tools for the die shop are also practically completed.

Brigg's new die shop, erroneously stated among architect's reports as being planned for erection on Dix Avenue, is to be an enlargement of the present die shop on Vernor Avenue on the East Side of Detroit. Since the project is only in the early stages, no machinery bids have yet been called for. As a reflection of activity in the automotive industry, the Michigan Tool Co. is completing a sizeable addition to its present quarters to provide space largely for gear cutting machinery production. New machine tools have been purchased in substantial quantity, and the new wing will be formally opened in early February.

Building Permits Up

Factory building permits issued in Detroit increased 75 per cent in 1935 over the corresponding dollar figure in 1934—$2,922,131 as against $1,670,180. Unit value also rose from $32,200 to $41,200 per factory building or shop. An even better year is anticipated in 1936. Bids are due Jan. 15 on an addition to the power house of Chevrolet Motor Co. Contracts are being awarded for an addition to the factory of the Wayne Screw Products Co. Detroit Lubricator Co., carburetor manufacturer, is preparing plans for alterations and additions. While none of these projects is large, they are indicative of the widely diversified activities in industrial construction in this area.

Packard earnings in 1935 are estimated at $3,000,000, or 20c. a share. A 10-cent disbursement has just been declared. The company produced 52,256 cars last year, higher than any previous year and almost nine times the 1934 volume —the most spectacular increase of the whole industry.

Other official production figures are now being made available: Buick made 107,611 cars in 1935, an increase of 36 per cent over the previous year's figure. Oldsmobile production was up 122 per cent, from 82,500 to 183,000. Pontiac world output rose from 82,496 to 181,168. Among the lowest-price contenders, Ford topped all others with a world output of 1,335,865 cars and trucks. Comparable figure for Chevrolet is 1,066,196, up from 868,192 in 1934, and over the million mark for the first time since 1929. A healthy situation is indicated by Chevrolet dealer sales of 1,425,209 used cars in 1935, compared with 865,842 new car sales in the United States.

Dodge Truck Announcement

Although passenger car announcements were made in November, new trucks are being announced in January. Dodge came out with a new line of trucks last week in capacities from one-half to four tons in wheelbases from 116 to 180 in. Smoother body lines, with new sloping rear ends are featured, and the loading area has been shifted forward relative to the axles. Amola steel, a special alloy of high endurance limit developed by Chrysler, is the spring material in all models.

For the one-half ton truck, a heavier frame is found, of double-drop type, with five substantial cross members of box section. An innovation in the rear axle housings for the 1½-ton truck is the construction whereby a seamless steel tube is expanded at the center for the differential and contracted at the ends for the wheel bearings. Combined brake supports and spring seats are electrically welded to the housing, which is subsequently heat-treated.

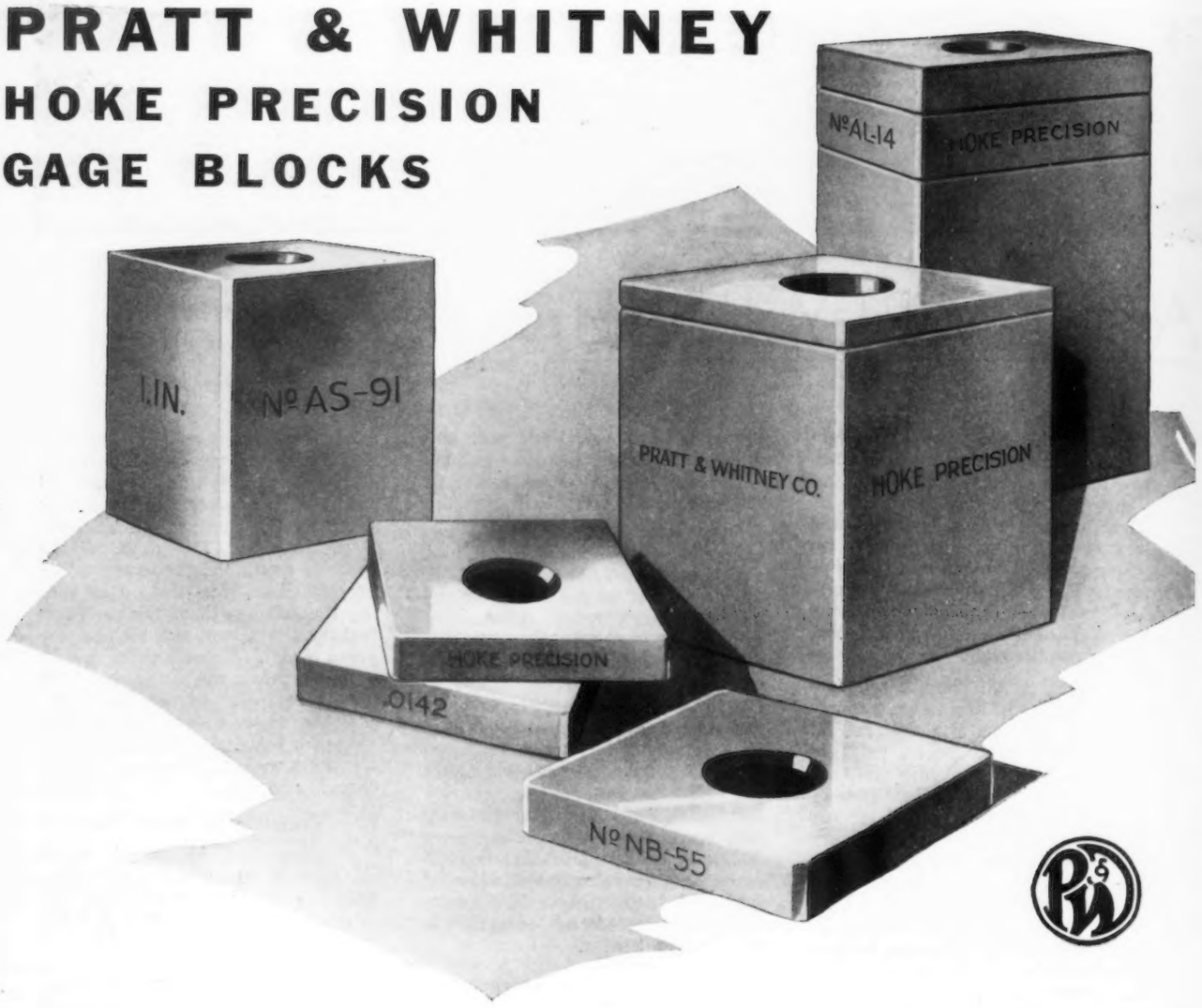
Hudson will be represented in the commercial car field with a line of six Terraplane models. The custom panel delivery model is rated at ¾-ton capacity and provides 130 cu. ft. of load space. In the utility coach model, through the removal of the rear seat, 110 cu. ft. of load space is available, the capacity being 1000 lb. Steel lockers extending the full length of the steel box feature the ¾-ton cab pick-up express model. These lockers can be unbolted when the full size of the box is desired. In use, they conceal the wheeelhouses and provide space for tools. In the line are also a station wagon, chassis alone and chassis and cab.

Cadmium In Wider Use

Because two important motor car manufacturers called for motor bearings this year with high cadmium content, the market for that metal has gone out of sight. Its advance from 55c. to over $1 a lb. has caused no end of embarrassment not only to the manufacturers of the bearings themselves, but particularly to platers. The marginal job shop has practically been forced to drop this type of business. Large users of cadmium plating in the automotive industry are resorting to bright zinc plating. Zinc is selling around 7c. a lb. One bearing manufacturer commented recently that in figuring costs, he took the raw materials price and *subtracted* 25 per cent for labor.

The most uncertain factor in the situation is that, overnight, the car manufacturers may abandon this type of crankshaft bearing, leaving the bearing people high and dry with inventories out of sight. Packard has successfully used a high-lead copper bearing, without endangering the lead supply. Others may follow. It reminds one of the situation in the paint industry. Prices of the three principal body oils fluctuate widely from week to week. The chemist watches the play of the market and changes his formula inversely as the price of raw materials. We may yet see this situation among the metals of limited supply.

PRATT & WHITNEY
HOKE PRECISION GAGE BLOCKS



ACCURACY HAS CHANGED ITS JOB

It has stepped from the Laboratory into the shop. It works on the bench and at the machines. The price of Accuracy has been brought down ruthlessly by Pratt & Whitney ways and means until every manufacturer making metal products can afford to employ accuracy in his plant. Afford Accuracy? He *must* employ Accuracy to keep his place in the competitive age we are entering. Even in low-priced products old tolerances must go and be replaced by the new Accuracy the Times demand. Do not waste a week or a day finding out how Accuracy can be employed to better your product, enlarge your market and retain your customers. Call in a P & W Sales Engineer who, without obligation, will work with you and our laboratories to devise a practical, money-saving way for you to use Accuracy.

Write to Pratt & Whitney Co. at Hartford, or to our Sales Offices at Boston, Birmingham, Cincinnati, Philadelphia, New York, Chicago, Pittsburgh, Detroit, Cleveland, Los Angeles, San Francisco, Rochester, St. Louis.

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PRATT & WHITNEY COMPANY
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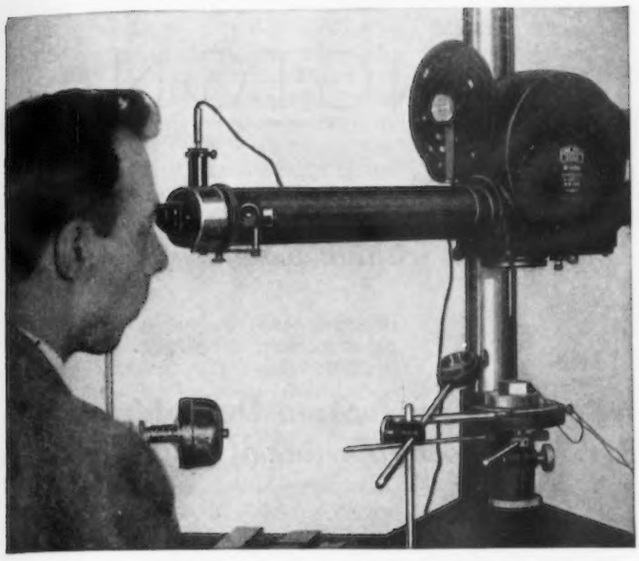
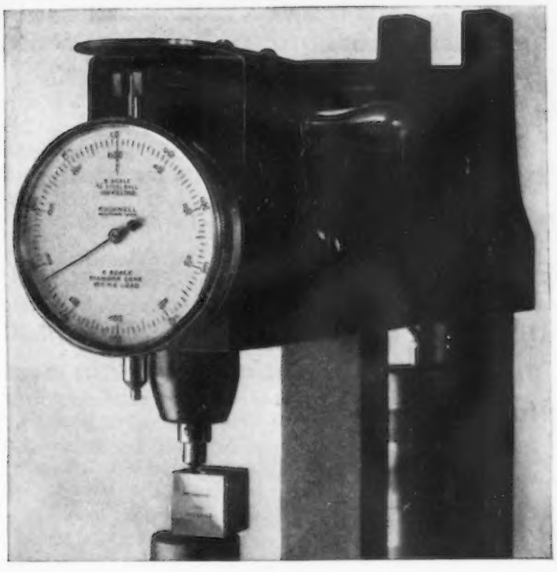
HOKE PRECISION GAGE BLOCKS ARE



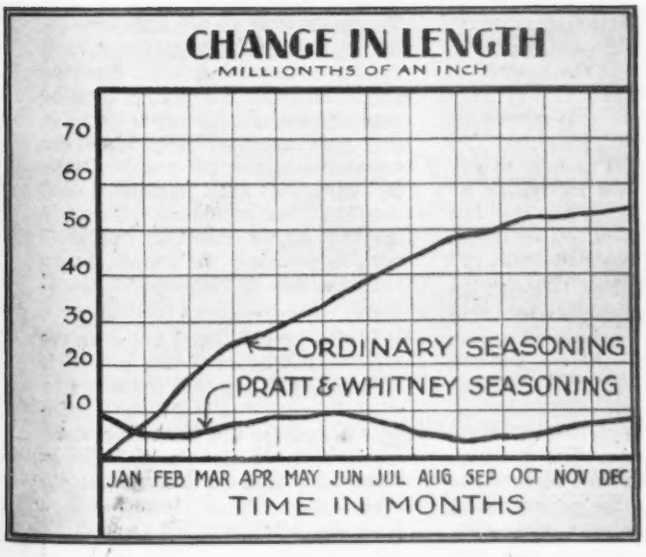
ACCURATE

Every P&W Precision Gage Block is checked individually for flatness, parallelism and length at the International Standard temperature of 68° F. Special measuring equipment of the finest is used, and because of this careful inspection we can guarantee every block. P&W Blocks are the most accurate commercial products made, guaranteed to be within five millionths of an inch for length in sizes up to and including the .600" Block, and within eight millionths per inch of length above that.



HARD

Each P&W Block is tested individually, and must Rockwell at least C-67. That is why it remains accurate so long in use. Extreme care is exercised at every step of the special heat treating process . . . a process developed by P&W engineers and metallurgists and used only in our plant. We know of no gages that will wear as long as P&W Gages.



STABLE

Due to a special seasoning treatment, P&W Precision Gage Blocks will not "grow", but will remain constantly accurate except for normal wear. As shown at the left, four-inch blocks subjected to ordinary seasoning have "grown" as much as sixty millionths in one year. P&W Blocks will not do this. They are as continuously stable as modern science can possibly make them.

P&W HOKE PRECISION GAGES ARE STANDARD AT 68° F.

THIS WEEK IN WASHINGTON

Progressive destruction of United States tariff structure is carried on without benefit of Congressional advice.

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President tones down Jackson Day address after public reaction to his opening of Congress.

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Bonus advocates point out enormous lift in buying power which would follow compensation payments.

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Major Berry sets up committees to guide his Council for Industrial Progress.

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Swiss-American reciprocal tariff agreement provides for reduction in duties on certain steel-making alloys.

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By L. W. MOFFETT

Resident Washington Editor, The Iron Age

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WASHINGTON, Jan. 14.—Tearing down of the Hawley-Smoot tariff act proceeds apace. . . . Simultaneously with the warning of W. A. Irvin, president, United States Steel Corpn., in an address before the Union League Club in Chicago last Thursday against lowering of tariff rates, the State Department announced the signing of the tenth reciprocal trade agreement, made with Switzerland. . . . So numerous and broad have been reductions in American tariff duties as the result of these agreements that the Hawley-Smoot law, despised by the Administration, as it stands now is greatly changed from its original form. . . . These changes, it is to be kept in mind, are made by executive fiat, a complete departure from traditional policy. . . .

Perhaps unconstitutional, as many legal minds contend, the New Deal tariff policy, like other of its acts, some now in the discard as unconstitutional, is the work of a Congress of political puppets. . . . Abdicating authority, which Congress probably had no right to do, the legislative function of making tariff was turned over to the executive branch at the request of the latter. . . . Unquestionably one purpose in mind was to remake the tariff in a pattern to suit the tastes of the Administration. . . . It is not the answer to say that some desirable revisions have been made in duties. . . . Nor is it the answer to say that undesirable changes have been made in the various schedules, including the metal schedule. . . . Again, it is not the answer to say that the tariff was a log-rolling issue in Congress. . . . The same can be as easily said of other issues with which Congress still deals. . . .

Rather, the answer is that this Government is made up of three coordinate branches and of checks and balances. . . . Each branch is a check on the other two. . . . Each is without power to delegate authority to other branches. . . . Tariff-making, subject to both executive and judicial check, was assigned to Congress. . . . If the people didn't like the job Congress did, they could go to the ballot box and change the complexion of Congress, as they have done in the past. . . . To say that the people have had little or nothing to say about it is political moonshine. . . . For the power lies with the people, and the term is not used in the sense of soap palaver. . . . If they do not exercise the power the responsibility is theirs. . . . If it is desired that tariff-making be placed exclusively in the hands of the executive branch, certainly the way to assure this method is by constitutional amendment. . . .

While the New Deal has gone the limit in taking over this power, it is only fair to say that the way was opened under the Harding Administration, when the Chief Executive, after investigation and hearing, was authorized to decrease or increase duties by proclamation. . . . This was what is called the flexible tariff policy. . . . Under the New

Deal, the inducement to change rates obviously became a fixed policy because the New Deal was authorized to negotiate reciprocal tariff agreements, a power never before vested in the executive branch. . . . By the very nature of a reciprocal agreement, changes in duties inevitably will be downward, not upward. . . . Though, of course, the New Deal still has the right to increase or decrease duties under the flexible tariff policy, a Republican policy, by the way, the constitutionality of which was strongly questioned. . . .

Yet the power to make changes under the flexible provisions naturally is narrowed, for after changes are made under reciprocal agreements, they are to remain static during the life of the agreements. . . . Unless, of course, they are lowered further by mutual agreement, the rates to apply not only to the country making an agreement with the United States, but the American rates to apply to all countries with which this country has a most-favored-nation treaty. . . . Whether or not modern-day international relations and economy require quicker tariff changes than heretofore, it still remains a fact that determination in favor of or against the change should be based on established constitutional authority. . . .

In view of the delegation by Congress of broad powers to the executive branch, it is ironical that New Dealers in Congress should have burst forth in broadsides against the Supreme Court as an "oligarchy" for knocking out the AAA. . . . On the one hand, they have willingly surrendered powers to the Chief Executive and are ready to praise him for whatever use he makes of those powers. . . . On the other hand, they break out in political rage and attack a group of men, the Justices of the highest court in the land, for exercising their authority. . . . Or if it can be said that the Supreme Court has no right to declare a law unconstitutional, it can be pointed out that such authority has been exercised since the days of the country's third Chief Justice, John Marshall of Virginia. . . . And if Congress proceeds to limit the power of the Supreme Court, an act which it is strongly suspected it will not perform because of public unpopularity, it will do well to take back at the same time many of the powers it has abdicated. . . . Not that the public has a high regard for Congress or much faith in its "statesmanship." . . . Rather, it might generate greater public interest in seeing that the standards of Congress are raised much higher than they are today. . . .

The Supreme Court Justices who ruled against AAA were in such strong disfavor among some of their irresponsible critics that these Justices were subjected to the shameful spectacle of hanging in effigy. . . . The truth is that the entire court has and deserves the sincere respect of the public at large, despite efforts of rabble rousers. . . . And it is a safe bet that the majority opinion in the AAA case was popular with the public at large, though manifestly its value lies in its merit, not in mere popularity. . . . It is also significant that the Administration constantly refers to the "opinions" in the AAA case, obviously calling attention to the minority report which was favorable to the Administration. . . . Perfectly proper it is that the public should be urged to study the minority as well as the majority opinion, yet when the Administration engages in its tirades against industry it scoffs at critics from that source as representing only a "greedy" minority whose enmity is preferable to its friendship. . . . At that, it was noted that in his Jackson Day dinner blast, the President hit a somewhat different key from that sounded when he delivered his message on the "state of union" to Congress. . . . He narrowed the area of his punches at industry and appeared to be seeking to salvage as much of this kind of friendship as he could. . . . The tunes on both occasions were largely similar, but, if possible, the Jackson Day dinner, given in the name of Democracy, at $50 per plate, brought forth a weaker forensic effort than was the miscalled message to Congress. . . .

There are some blasts coming from the New Deal opposition, though, that rate a marking of zero-minus. . . . And what makes the situation all the more depressing is that the campaign has some nine months to go. . . . The inconvenient position in which some of the wordy opponents find themselves is that they went along whole hog with the New Deal when it was at the zenith of its popularity and was rollicking at high tide with its vast and complex legislative and administrative machinery of "economic planning." . . . For example, Senator Byrd, Democrat, of Virginia, calling for a retrenchment in Federal spending, has pointed out that both parties in Congress have given support to the spending program. . . . As a case in point he cited the $4,880,000,000 relief bill voted for by a majority of the Republicans in the Senate. . . . He could have gone much farther and in doing so could have pointed out that all but six Republican Senators voted for the AAA, whose death sentence brought broad smiles from them. . . . There is also strong Republican support for the soldiers' bonus, as shown by the House vote last Friday, and apparently for further large appropriations for WPA and other so-called relief purposes. . . . Which shows that political expediency is not exclusive with any party. . . .

▼ ▼ ▼

Sound Legislation Will Meet With Approval

Sound legislation both for the farmer and for relief will meet with strong public approval. . . . But when legislation of this sort is made political in character it is quite another story. . . . And the country is suffering from an overdose of this sort of legislation. . . . On farm legislation, for instance, it is notable that strong pressure has been brought to bear to put it through and it has been effective. . . . Groups of farmers, under Administration sponsorship, have been brought to Washington to stage demonstrations. . . . Upon the fall of AAA, farm groups were called to Washington by the Secretary of Agriculture to work out a new program . . . not, let it be hoped, to "intimidate" the Supreme Court against further unfavorable decisions for the New Deal. . . .

The demonstration itself was off-color, just as are "marches" on Washington, but for the farmers to come to Washington and legitimately work for a sound legislative program is decidedly desirable. . . . The same is true of any other group of citizenry. . . . Yet if industrialists venture such moves they are railed at as lobbyists. . . . In any event, if fair legislation to aid the farmer is needed and is enacted, that will be all to the good—good for the farmer, for industry and for the country as a whole. . . . Just as it is good for the farmer that, in negotiating reciprocal tariff agreements, the Administration has seen to it that preciously little protection has been withdrawn from him. . . . The same solicitude has not been shown the industrialist who has less protection than the farmer, but that does not alter the fact that the farmer should be given great consideration in the way of tariff protection. . . . One trouble has arisen from encouraging him to plow under, curtail and slaughter, in exchange for rental and benefit checks to the extent of some $1,400,000,000. . . . His foreign markets have been restricted and competitive agricultural products have been imported in ever-increasing volume. . . . This is one of the reasons all farmers did not weep over the AAA decision freeing them

from regimentation. . . . Many were pleased with it, though the Administration played down that fact. . . . It was noticed, too, that agricultural prices have held steady since the decision, and there are those who think they are slated for a rise. . . . In which event the farmer would quickly lose interest in Washington. . . .

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Where Bonus Would Go

Bonus advocates have caught on to the intriguing idea of spending the country to prosperity. . . . The American Legion News Service has issued a long statement which tells precisely how much each industry will get out of that "'pump priming' that payment of the adjusted service certificates will bring about." . . . These details, covering "every conceivable line of business," are based on "a survey completed by the *American Legion Monthly* on Jan. 2, 1936." . . . The envelopes returning questionnaires, the statement points out, were turned over unopened to George S. Olive & Co., certified public accountants, of Indianapolis, "by whom the first 42,500 questionnaires returned were counted, audited and projected." . . . Merchants and retailers throughout the country, it is stated, will receive a total payment of $623,615,793.86 (good to and including the last penny), from 1,897,836 veterans on depression-incurred debts and bills. . . . This sum, it is explained, represents 31.393 per cent of the total bonus payment. . . . Moreover, the survey shows, it is explained, that 53.94 per cent of the veterans receiving payment will apply at least part thereof on the settlement of their old accounts. . . . etc., etc., etc. . . . But hurrying to our own fields, the statement says that 368,789 motor vehicles will be required, for which the world war veterans will spend $122,716,430. . . . The vehicles will consist of 323,922 passenger automobiles and 44,867 trucks. . . . Using an estimate of the Bureau of Foreign and Domestic Commerce, the statement sets forth the quantities of materials needed to make these vehicles. . . . Among the items, in tons, are: Steel, 536,157; malleable iron, 32,841; gray iron, 77,121; aluminum, 1586; copper, 10,848; lead, 24,649; zinc, 5867 . . . and there are many other enticing tidbits of business, including $43,821,038 worth of farm implements for 220,115 veterans. . . . By the same line of reasoning it is to be assumed that if the bonus were doubled just twice as much would be used to prime the pump and twice as much employment assured. . . . And the scale could be run on up into the highest altitudes. . . .

Few, if any will be deluded into the belief that the bonus promises any such buying as is claimed, and, that even if it should, enactment of the bill is justified. . . . However, the test is near at hand, as the House, by the overwhelming vote of 356 to 59, railroaded the Vinson-Patman-McCormack cash bill and laid it before the Senate, which undoubtedly will pass some form of a bonus bill. . . . Presidential veto or no Presidential veto, indications are that the persistency of war veterans for a bonus finally has achieved its purpose. . . . In view of his previous resounding veto of a bonus, it is not seen how the President can give his approval to the one now about to be passed, but the majority in the Senate, as in the House, likely will be so great as to override a veto. . . . The House bill might be called a pyramiding bonus, since it stacks one upon another, entailing an outlay of some $2,200,000,000, without providing any appropriation or means of raising the money, a mere incidental to political supporters. . . .

The House, which has passed every bonus bill offered in the past 17 years, actually has passed the buck to the Senate, and the Administration and Senate leaders are supposed to be considering a baby bond issue to gratify the 3,500,000 World War veterans' demands. . . . Inflationists also are talking of starting the printing presses. . . . The House bill provides that the bonus paid would be the face value of certificates, minus loans against them, the unpaid interest to be canceled. . . . Veterans not cashing certificates before April 6, 1937, would be paid 3 per cent interest on face value, less principal of any loan up to Jan. 1, 1935. . . .

Efforts of a Republican group, headed by Representative Allen T. Treadway of Massachusetts, to recommit the bill and provide for payment of the bonus out of the unexpended relief funds went down to smashing defeat, 319 to 89. . . . The vote for the bill: Democrats, 279; Republicans, 68; Progressives, 6; Farmer-Laborites, 3. . . . Against the bill: Democrats, 28; Republicans, 31. . . .

Tribute should not be withheld from New Deal "supporters" who by voting for the bill have knocked the President's budget cock-eyed, and accelerated the headlong dash into the growing sea of red ink. . . .

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Hope Springs Eternal

It was not long ago that lawyers of the American Liberty League were vigorously assailed by critics for pre-judging New Deal legislation, holding that much of it is unconstitutional. The league's view of the AAA has been sustained. It also said the Wagner labor disputes act and the Guffey coal act were unconstitutional. Judge Otis in Kansas City recently held that the former is unconstitutional. Some time previous, different judges held that the Guffey coal act was unconstitutional. Justice Adkins, in the Supreme Court of the District of Columbia in the J. W. Carter case, sustained portions of the Guffey act providing a code system for the bituminous coal industry, but held against the wage and hours provisions.

Now the National Labor Relations Board and the National Conference of Bituminous Coal Producers, apparently jittery over the AAA decisions, have come out with statements. The board assures the public that the Wagner act is constitutional. The Conference of Bituminous Coal Producers assures the public with equal emphasis that the Guffey act is constitutional. Each goes to some pains to draw the distinction between provisions of these two acts and findings made by the Supreme Court in both the NRA Schecter case and the AAA case.

Next comes the turn of the Supreme Court. It is to review the Guffey act the week of March 9, and, while no date has been set, it is expected to pass on the Wagner act within a comparatively short time.

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Berry Council Sets Up Committee

Setting up seven committees, each with eight members, divided equally between management and labor representatives, Maj. George L. Berry's Council for Industrial Progress has assigned a subject for possible legislation to each committee. The committees will meet jointly at undetermined dates, and, if they agree, will make reports to the full council. The reports then will go to the President, who, according to Coordinator Berry, "will perhaps in turn submit them to the chairman of the Senate Finance Committee and the chairman of the House Ways and Means Committee."

The committees' subjects are: National industrial policy; maximum work week, general wage and child labor; fair trade practices; competition, both internal and external, affecting American standards; Government competition with private enterprise; anti-trust laws, including Federal Trade Commission act, and their effect on industry.

D. G. Sherwin, vice-president,

Caterpillar Tractor Co., Peoria, Ill., is a member of the committee on national industrial policy; George Alcock, Lima Locomotive Works, is a member of the committee on competition affecting American standards and E. B. Abbett, National Corrugated Rolled Metal Culvert Pipe Association, and the Newport Culvert Co., Newport, Ky., is a member of the committee on Government competition with private enterprise.

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Engineering Delegates Convene

Representatives of national, State, and local engineering societies convened last week for the sixteenth annual meeting of the American Engineering Council, at the Mayflower Hotel. The sixth conference of secretaries of engineering societies also met, and sessions of the national council will be continued on Friday and Saturday.

Prominent engineers who spoke in the conference include Col. J. Monroe Johnson, Assistant Secretary of Commerce, whose topic was "The Engineer in Government and Business." J. F. Coleman of New Orleans, retiring president of American Engineering Council, spoke on "Progress in Engineering Organization." Gen. R. I. Rees of New York spoke on "Opportunities for Unity Among Engineering Organizations." Discussions were held on problems of engineering society management.

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Tariff Changes on Alloys For Steel Making Announced

American tariff duties on alsimin and a restricted classification of alloys for steel-making were reduced by 50 per cent in the Swiss-American reciprocal tariff agreement announced last week by Secretary of State Cordell Hull. Reductions also were made in American duties on special machinery items, files, and restricted classifications of rivets, nuts and washers and screws, except wood screws. The Department announced that imports of these items have been small.

Concessions granted by Switzerland included the binding of duties and increasing of quotas on electric refrigerating machines and apparatus and oil burners and parts. Duties were bound on typesetting machines for book printing and binding machinery other than other graphic industries; book-printing presses and on calculating machines and parts except on those of more than 20 to 100 kg. On the latter the Swiss duty was reduced from 600 to 450 Swiss francs per quintal. The Swiss quota on imports of American passenger automobiles, trucks and chassis was increased from 2406 to 4812 units and duties bound. Duties also were bound on typewriters and parts and cash registers, registering accounting machines and parts.

The reciprocal tariff concessions and the minimum quotas granted the United States are to become effective Feb. 15. The entire agreement is to become effective 30 days after the exchange at Berne of the instrument. It is to remain in effect three years.

Duty Reductions Made by the United States in the Swiss-American reciprocal tariff agreement announced last week.

	Old Rates	New Rates
Alsimin, ferrosilicon aluminum and ferro-aluminum silicon for steel-making: Having 20-52 per cent of aluminum and having silicon and iron as other principal components.	2½c. per lb.	1¼c. per lb.
Alloys, not less than 28 per cent iron, not less than 18 per cent aluminum, not less than 18 per cent silicon and not less than 18 per cent manganese	25 per cent	12½ per cent
Testing machines for determining strength of materials, wholly or in chief value of metal and not specially provided for	35 per cent	20 per cent
Steam boilers, for working pressure exceeding 30-lb. per sq in	35 per cent	20 per cent
Laboratory testing machines	40 per cent	20 per cent
Files, file blanks, rasps and floats: 2½-in. in length and under	25c. per doz.	20c. per doz.
Over 2½-in. and not over 4½-in. in length	47½c. per doz.	25c. per doz.
Over 4½-in. and under 7-in. in length	62½c. per doz.	35c. per doz.
Jig boring machine tools	30 per cent	15 per cent
Testing machines, mechanical	27½ per cent	20 per cent
Knitting machines, except full-fashioned hosiery and circular knitting machines	40 per cent	27½ per cent
Water turbines	27½ per cent	15 per cent
Rivets, nuts and washers and wood screws of base metal other than iron and steel (restricted classification)	45 per cent	30 per cent
Screws, except wood screws (restricted classification)	45 per cent	30 per cent

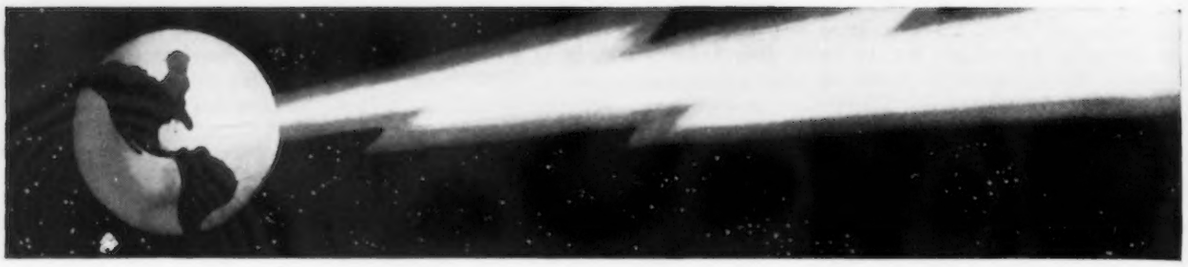
Knudsen Addresses Tool Engineers

A YOUNG man planning a career in the automobile industry would do well to spend a period of apprenticeship in an aircraft factory. This bit of vocational advice was proffered by William S. Knudsen, executive vice-president, General Motors Corpn., in a talk before the Detroit chapter, American Society of Tool Engineers, Jan. 9. He considered the influence of the aircraft industry would be felt chiefly in more efficient use of materials in their proper proportion and in their proper places. In other words, more brains and less cast iron.

Despite the fact that the progress made in the past five years in the development of cars in the lowest price range was greater than any developments made in the previous ten, Mr. Knudsen predicted even greater progress in the next decade. The trend is toward lower manufacturing costs, increased accuracy, improved fuels, higher compression ratios, more ingenuity in the use of new materials. "It will be a question of how far you can go beyond the elastic limit."

The used car problem will be solved by making better new cars, but the speaker thought that the idea of trading in a car at the end of a year for a new one was "all wet." He also deplored speeding up the conveyor line to increase production. "You end up by finishing the car out in the yard."

This was one of the largest gatherings of tool engineers yet held. R. M. Lippard, president of the organization, and Detroit manager of the Heald Machine Co., told the some 400 members and guests present of similar meetings at Racine, Wis., and Cleveland, where active chapters are rapidly building up. Chapters are in the formation in Chicago, Rochester and Hartford. Membership is composed not only of tool engineers and designers, but master mechanics, toolroom foremen, and machinery sales and service men.



NEWS OF THE WEEK

Irvin Attacks Trade Agreements, Asks Moratorium on Regulation

THE mutuality of the interests of management, workmen and stockholders in present-day industry makes legislation inimical to any one of these groups prejudicial to all, W. A. Irvin, president, United States Steel Corpn., told the Union League Club, Chicago, in an address Jan. 9.

Carrying the thought further, he stated: "Legislation and taxation which discourage capital accumulation, thus preventing capital investment, are not only working against the interest of these three groups, but against the welfare of the whole people."

As an example of legislation threatening the future of industry he cited the reciprocal trade agreement act and its administration.

"Our markets are being unsettled by the revision downward of the tariff on many of our manufactured products, including iron and steel," he declared. "How can we maintain our wage structure and keep up workmen's standards of living if foreign subsidized products are permitted to compete in our markets?

"In many of the foreign countries wage rates are less than one-half that of our industry. Coupled with low wages, the cost of ocean freight from Germany to New York is only 60 per cent of the rail transportation cost from Pittsburgh to New York.

"If we are to continue paying high wage rates as compared with our foreign competitors our workmen must have the benefit of a protective tariff. I am for wage rates and earnings as high as business can afford to pay and I should deplore any downward revision of wages necessitated by reason of excessive importations."

Mr. Irvin pointed out that nearly 450,000 employees are directly employed in the manufacture of iron and steel, who with their dependents number 2,250,000 in the aggregate, and these figures do not take into account hundreds of thousands of employees who are indirectly given employment through the activities of the steel industry —in furnishing the raw materials, and fashioning the countless articles made from steel.

He also called attention to the fact that the steel industry requires a high volume of production before any return accrues on capital investment.

"Striking emphasis of this fact is found in a review of the results for the ten-year period ending with 1934, during which the industry as a unit earned something like 2½ per cent on its capital and surplus investment. In the period 1931-1934, the deficits suffered by the steel industry in the aggregate reached a total of nearly $300,000,000. Much of this loss must be attributed to the fact that the prices which we have been getting for our products have failed to keep pace with increasing costs, due in large part to the voluntary advances in wages which the industry inaugurated in its effort to cooperate with the Federal Government's endeavor to promote recovery.

"Though there has been some increase in steel prices in the past two years, this increase has been substantially less than that experienced in the general commodity price level in the same period."

Referring to artificial efforts to promote recovery, he said that "it is difficult to separate the psychological effects born of the depression itself and the play of natural forces toward recovery, from the effects created by the intensive efforts which have been made to stem the course of the depression."

However, he urged a cessation of governmental interference with business.

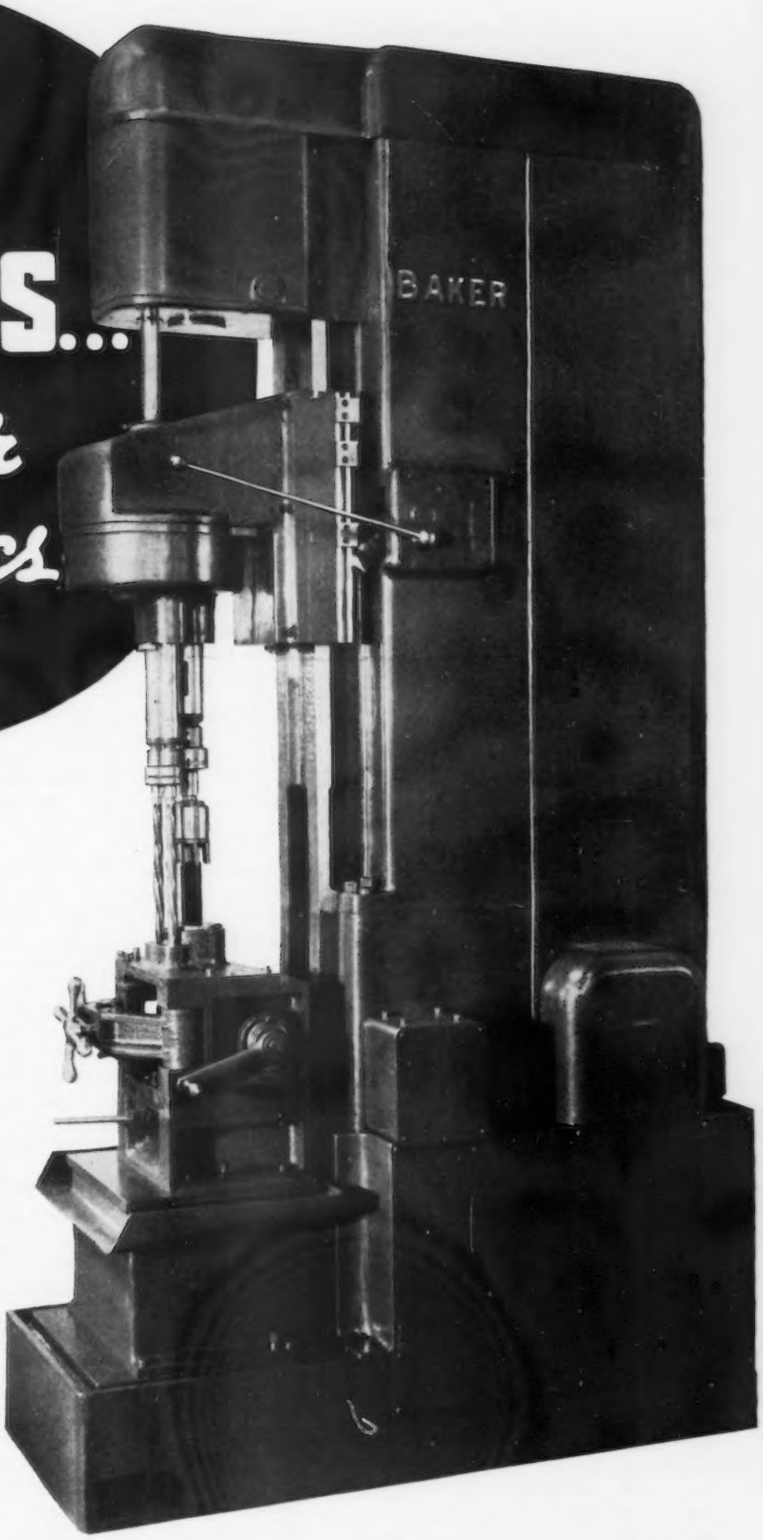
"May I express the earnest hope," he declared, "that the governing powers of this nation, whether Federal, State or local, will see the wisdom of subjecting business at this time to no further regulatory legislation, at least not until the country has had time to digest the great mass of new legislation and regulation which is hardly yet effective. Let us hope that the wisdom of pausing, until the effect of these regulatory measures is known, will be apparent. It is difficult to proceed with business in an orderly manner when we are faced with continuing uncertainties of new situations confronting us, and their effects upon costs and upon revenues."

Conference on Fluorspar Utilization Scheduled

M. M. LEIGHTON, chief of the Illinois State Geological Survey Division of the State Department of Registration and Education, has made known details of the program of a mineral industries conference to be held at Rosiclare, Ill., Jan. 24, devoted to a discussion of trends in the utilization of fluorspar.

The purpose of the conference, as stated by Dr. Leighton, is to

NEW METHODS... *Baker Machines*



The pressure for lower costs in manufacture creates the necessity for modern production tools. Years of experience coupled with advanced engineering make Baker the logical builder of 1936 equipment.

The machine illustrated is the adaptation of the Baker "Clean Line" 10 HO to produce 1936 transmission cases. The machine line reams the main, countershaft and idler holes in the cases. The solenoid-operated jump feed attachment produces a rapid traverse between the sections being machined, and at 80% efficiency the machine handles 90 pieces per hour.

If you have a new production problem or an old one that is not satisfactorily solved, submit it to our engineers. Send a sample or blueprint.

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acquaint all who are interested in the mining and use of fluorspar with the researches which are now in progress and which are expected to bring to light new uses for the mineral, thus widening the market field for the industry.

The conference will be sponsored jointly by The Illinois State Geological Survey, The United States Geological Survey, and the producers of fluorspar in the Illinois-Kentucky district.

New England Foundry Group 40 Years Old

THE fortieth anniversary of the founding of the New England Foundrymen's Association was observed with an entertainment and dinner at the Engineer's Club, Boston, on Jan. 10.

The members generally had a somewhat more optimistic viewpoint than has been the case for several years. They felt that business generally was rounding out in a satisfactory way and that sooner or later this was bound to spread into the foundry business in greater measure than has been the case for the past several years.

Prior to the banquet the annual election of officers took place, while following the dinner officers and several of the guests delivered addresses.

Hearing on Labor Board Complaint

A HEARING before the Regional Labor Board was held at Pittsburgh last week in connection with the request for an election at the Pittsburgh Steel Co.'s plants at Monessen and Allenport, Pa. Counsel for the company requested dismissal of the petition, which was filed by the Amalgamated Association of Iron, Steel and Tin Workers.

Company counsel filed a petition to the effect that the Regional Labor Board lacked authority to investigate the purported controversies and attacked the Wagner Labor Bill as being in violation of the Constitution. The board ruled, however, that the hearing would proceed, and the board's attorney presented records supporting his contention that the Pittsburgh Steel Co. is engaged in interstate commerce. The company contends that it is intrastate and that its manufacturing and bargaining with employees are within the State and are not subject to investigation under the Wagner Labor Bill.

Blame Business Itself for Allowing Government Invasion of Private Rights

TAKING as his topic "Government in Business," J. Howard Pew, president, Sun Oil Co., Philadelphia, told the convention of the Atlantic States Shippers Advisory Council last week that American business is itself largely to blame for the invasion of Government into the field of business.

"There is constant protest against multiplication of Government agencies to police and control business," he said. "But who is to blame? The very business interests which now condemn these things were only a few years ago asking for them. The agencies and activities set up in response to these demands account for tens of thousands of people on the Government payroll and hundreds of millions added to the Federal budget.

"Unless Government is to dominate all business we must have a major political operation soon. The modern physician, before prescribing radical treatment, inquires into the cause of infection. He commonly finds that bad habits of life are to blame. And our business patient, similarly, is largely responsible for his condition. Business has been too willing, even eager, to submit to Government control. The notion that Government can by some magic touch produce prosperity is as old as history. In most cases it originated with interests that hoped to profit through privilege. It was the men of business who asked the Government to intrude into business.

Regulation vs. Control

"Certain relations of Government to business are justifiable, even necessary; but we must distinguish between regulation and control. Government should protect workers against injury; should foster free competition and the law of supply and demand. These, with police protection and laws against fraud, constitute Government's responsibility.

"Government control is different. Here a fundamental of economics is involved. The fixing of rates for services or prices for commodities; the control of production or distribution—any devices which interfere with the free and flexible operations of business, constitute an invasion of business that is wrong and indefensible.

"American business bears a heavy responsibility in this regard. Lawmakers are constantly importuned for immunities or advantages to particular interests. Thus, in 1918, leading trade organizations wanted the Government to develop waterways; but of late the same interests have clamored for Government restriction of all transportation that might compete with the railroads.

"In 1924 the United States Chamber of Commerce endorsed the recapture provision of the Transportation Act of 1920. I doubt if today you could find, among those who voted for that endorsement, a corporal's guard who would vote the same way.

"Again, I believe in a protective tariff to strengthen our national economy and relieve our dependence on more developed countries. But in the last generation tariff making has become more log-rolling among seekers after benefits, leading the unprotected interests to demand other privileges or subsidies, such as processing taxes. A list of organizations and individuals asking special treatment in the tariff of 1929 covered more than 200 printed pages; their briefs more than 18,000 pages. Yet Government is blamed for wanting to control business!

Praise Sherman Act

"In 1890 Congress passed the Sherman anti-trust act, to protect competition and prevent monopoly; one of the most beneficial laws of our time. Yet within a few years there were demands for modifications, and a number of laws were passed making exceptions. The United States Chamber of Commerce bore a large responsibility in framing and adoption of the National Industrial Recovery Act. That act undertook to suspend the anti-trust law as to a wide range of interests; and the country has reason to be grateful to the Supreme Court for saving the anti-trust statute.

"Considering, then, how often business has advocated measures which it later condemned; and how often it has condemned measures which it later approved—I plead that those who speak for industry shall realize their responsibility. Government favoritism to particular interests will inevitably impose burdens on other interests and presently drive them all to seek Government shelter under Government control. That will be the end of independence, enterprise, industrial freedom and the common effort for the common welfare."

Decline in Shipments by Steel Corporation Slight—December Operating Rate Rises

SHIPMENTS of finished steel products by the United States Steel Corpn., totaled 661,515 tons in December, compared with 681,820 tons in November and 418,630 tons a year ago.

Because December contained one less working day than the preceding month, the corporation's finished steel-making facilities were engaged at a slightly higher rate, 42.7 per cent of capacity as against 42.3 per cent in November. During December, 1934, the rate was 26.1 per cent. Total shipments during 1935, subject to year-end adjustment, were 7,371,299 tons, compared with 5,905,966 tons in 1934.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

				1933		1934		1935	
Month	1930	1931	1932	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity
January	1,104,168	800,031	426,271	285,137	17.7	331,777	19.8	534,055	31.9
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3	583,137	39.2
March	1,240,171	907,251	388,579	256,793	15.3	588,209	36.6	668,056	41.5
April	1,188,456	878,558	395,091	335,321	21.6	643,009	41.5	591,728	36.7
May	1,203,916	764,178	338,202	455,302	27.1	745,063	44.4	598,915	35.8
June	984,739	653,104	324,746	603,937	37.4	985,337	61.2	578,108	36.7
July	946,745	593,900	272,448	701,322	45.1	369,938	23.0	547,794	34.0
August	947,402	573,372	291,688	668,155	39.8	378,023	23.1	624,497	37.3
September	867,282	486,928	316,019	575,161	35.6	370,306	23.0	614,933	39.7
October	784,648	476,032	310,007	572,897	35.5	343,962	20.6	686,741	41.1
November	676,016	435,697	275,594	430,358	26.7	366,119	22.9	681,820	42.3
December	579,098	351,211	227,576	600,639	38.7	418,630	26.1	661,515	42.7
Plus or minus yearly adjustment	(40,259)	(6,040)	(5,160)	(44,283)	...	(19,907)	...	.....	...
Total for year	11,624,294	7,676,744	3,974,062	5,805,235	30.1	5,905,966	30.6	7,371,299	38.3

British Steel Output Hampered By Shortage of Raw Material

LONDON, Jan. 13 (*By Cable*).—Steel makers are employing extra night shifts and are increasing output further, but are hampered by raw material shortage. Some iron makers are refusing to quote on export orders and even home consumers are on rations. The relighting of additional furnaces is being postponed pending settlement of the coal dispute when pig iron prices are expected to be advanced. Two thousand five hundred tons of Russian pig iron arrived here recently

Semi-finished steel output still is insufficient, but higher production is promised and Continental arrivals are increasing. Heavy specifications for finished steel insure high activity for months to come and further big business is expected.

Tin plate business is fair with bookings about as high as output though exports are at a standstill.

In the Continental iron and steel market a slight export improvement is reported and marked expansion is expected soon. Bars and sections are dull and plates and semi-finished steel are active.

Recent meetings of the International Steel Cartel discussed the final form of the Anglo-Continental agreement and the creation of an International Thin Sheet Cartel, but made little progress.

The British Iron and Steel Federation is negotiating for the importation of 100,000 tons of Continental semi-finished steel in the next three months in addition to the quota with an option on a similar amount in three months.

The International Steel Cartel and South Africa are negotiating for the latter's eventual membership.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export £9

Billets, open-hearth ..... £5 10s. to £5 15s.

Tin plate, per base box..... 18s. 9d. to 19s. 3½d.

Steel bars, open-hearth ..... £7 17½s.

Beams, open-hearth ..... £7 7½s.

Channels, open-hearth ..... £7 12½s.

Angles, open-hearth ..... £7 7½s.

Black sheets, No. 24 gage..... £9 15s.

Galvanized sheets, No. 24 gage...£11 15s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas. £2 7s.
Wire rods, No. 5 B.W.G. ..... £4 10s.
Steel bars, merchant ..... £3 5s.
Sheet bars..... £2 8s.
Plate, ¼ in. and up ..... £4 2s. 6d.
Plate, 3/16 in. and 5 mm.... £4 4s. 8d.
Sheets, ¼ in.... £4 9s. 8d.
Beams, Thomas. £3 2s. 6d.
Angles (Basic).. £3 2s. 6d.
Hoops and strip base ..... £4 2s. 6d.
Wire, plain, No. 8 ..... £5 7s. 6d.
Wire nails..... £5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G. ..... £8 15s.

Research Body Elects Officers

ELECTION of officers, trustees, and committees for 1936 has been announced by the Engineering Foundation, research organization of the national engineering societies.

H. P. Charlesworth, assistant chief engineer, American Telephone & Telegraph Co., was re-elected chairman and D. Robert Yarnall, Yarnall-Waring Co., Philadelphia, was chosen vice-chairman. Alfred D. Flinn continues as director and secretary.

Progress was reported in numerous investigations affecting science, engineering, and industry to which the Foundation, founded by Ambrose Swasey, devotes its resources. Alloys of iron and steel, welding, cement and concrete arches, earths and foundations, and barodynamics are among the fields in which activity sponsored by the Foundation are being carried on.

The Foundation's research procedure committee will be composed of Mr. Yarnall, chairman; L. W. Chubb, director of Westinghouse Research Laboratories; F. F. Colcord, vice-president, U. S. S. Lead

Refinery, Inc.; F. M. Farmer, vice-president, Electrical Testing Laboratories; Thaddeus Merriman, W. H. Fulweiler, and Alfred D. Flinn.

The following comprise the welding research committee: Prof. C. A. Adams, Harvard Engineering School, chairman; D. S. Jacobus, Babcock and Wilcox Co.; H. M. Hobard, General Electric Co.; James H. Critchett, vice-president, Union Carbide & Carbon Research Laboratories; F. T. Llewellyn, United States Steel Corpn.; Col. Glen F. Jenks, Watertown Arsenal; J. J. Crowe, Air Reduction Sales Co.; C. L. Eksergian, Budd Wheel Co., Detroit; and William Spraragen.

Members of the iron alloys committee are: Frof. George B. Waterhouse, Massachusetts Institute of Technology, chairman; Lyman J. Briggs, director, National Bureau of Standards; J. W. Finch, director, and R. S. Dean, chief engineer, metallurgical division, United States Bureau of Mines; J. T. Mackenzie, American Cast Iron Pipe Co.; John Johnston, United States Steel Corpn.; Prof. Bradley Stoughton, Lehigh University; Jerome Strauss, Vanadium Corporation of America; T. H. Wickenden, International Nickel Co.; J. H. Critchett; Wilfred Sykes, Inland Steel Co.; and Frank T. Sisco.

Frankland Is Chief Engineer of A.I.S.C.

F. H. FRANKLAND has been designated as chief engineer of the American Institute of Steel Construction, effective Jan. 1.

Lee H. Miller was chief engineer of the institute from its establishment in 1921 until his death in April, 1933, at which time Mr. Frankland took over the duties of the chief engineer in addition to his other functions in executive charge of the institute's district offices and technical service, being then designated technical director. Mr. Frankland is in charge of technical research and development, in addition to his other duties, and represents the institute on numerous technical society committees concerned with structural steel manufacturing, design and construction.

Mr. Frankland joined the institute in 1928, and was placed in charge of the organization and operation of the institute's district offices and engineering service. Prior to that he was structural engineer for Dwight P. Robinson & Co. for four years; vice-president and chief engineer of Bancroft-Jones Co., Buffalo steel constructor, for two years. He practiced in New York as a consulting engineer on the design and construction of steel bridges and buildings for two years, after four years as partner in the Waddell firm of consulting bridge engineers, where he was in charge of new business and preliminary designs.

PERSONALS

HAROLD L. HUGHES, who has been in the president's office of the United States Steel Corpn., since 1917, has been elected vice-president, with executive duties assigned by the president. A year after his graduation from Harvard University in 1900, he entered the service of the Carnegie Steel Co. at Pittsburgh as a draftsman in the structural department and was later transferred to the sales department. In 1904 he became assistant to the sales manager for Carnegie and Illinois Steel company products, in the United States Steel Products Co. at Montreal, and three years later was appointed sales manager and resident engineer of the Steel Products company at Sydney, Australia. In 1912 he was transferred to the New York sales department of the company, dealing with exports to New Zealand, Australia, Mexico and Central America.

W. A. FORBES, who has been identified with the Steel Corpn. and subsidiaries since 1895, has been made vice-president of the United States Steel Corpn., with supervision over by-product coke plants and disposition of their products. He entered the Homestead works as assistant chemist in the laboratory and was employed in that capacity until 1900. He was transferred to the National Tube Co. at McKeesport, Pa., where he served successively as assistant chief chemist, chief chemist and then assistant superintendent of blast furnaces until 1907. Beginning with the latter date he devote himself exclusively to the coke committee, with headquarters at Joliet works of the Illinois company during the construction of the first plant of Koppers by-product coke ovens. Mr. Forbes was transferred to the New York office of the steel Corpn., having charge of the sale of all coke by-products of subsidiary companies. In 1928 he was appointed assistant to the president, a position he has held until his present promotion.

CHARLES H. RHODES has been appointed vice-president, with general supervision over purchases. He entered the service of the American Steel & Wire Co. at Pittsburgh in 1899 and was appointed purchasing agent in 1909. Beginning with 1917 he served as purchasing agent of the Illinois Steel Co. and several other Steel Corpn. subsidiaries. He continued in that capacity until 1930 when he temporarily retired from business. Mr. Rhodes returned to the sales department of the Illinois company in 1933 and the following year was appointed assistant general manager of sales of that company. On Feb. 1, 1935, he was made director of purchases for the Steel Corpn., in which capacity he has served until his election to the vice-presidency.

JAMES K. SUTHERLAND, since 1927 superintendent of the blooming and skelp mill of the Campbell plant of the Youngstown Sheet & Tube Co., has been made general superintendent of the continuous hot strip mill and the blooming and skelp mills of the Youngstown Sheet & Tube Co. He started in the steel business at the old Brier

H. L. HUGHES

W. A. FORBES

C. H. RHODES

J. K. SUTHERLAND

J. INGERSOLL

A. G. GLOSSBRENNER

Hill plant in Youngstown in 1908. In 1923 when the Brier Hill plant was purchased by the Sheet & Tube company, he continued at that plant and was made superintendent of the blooming mill in 1926.

JONATHAN INGERSOLL, who takes Mr. Sutherland's place as superintendent of the blooming and skelp mills at the Campbell works, became identified with the company in 1915 after his graduation from Case School of Applied Science. After a year in the metallurgical department, he went into the blooming mills as a recorder and has been with the blooming and skelp mills ever since.

ALFRED G. GLOSSBRENNER, who has been made superintendent of the Youngstown company's continuous hot strip mill, associated himself with the company in February, 1935, as the mill's assistant superintendent. After attending the University of Wisconsin, he gained his early experience in the steel industry at the American Sheet & Tin Plate Co. and spent five years with the Illinois Steel Co. at South Chicago before going to Youngstown.

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THOMAS N. ARMSTRONG, JR., formerly associate metallurgist at the Norfolk Navy Yard, has been added to the technical staff of the International Nickel Co., New York. He will handle steel castings development for the company.

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GLENN L. BIERLY has been appointed general purchasing agent of the Empire Sheet & Tin Plate Co., Mansfield, Ohio. Serving with Mr. Bierly is ROBERT W. CELLERS who will specialize in the purchase of raw materials. After service in the World War Mr. Bierly became affiliated with the Empire organization as credit manager, later serving in the positions of auditor and comptroller. Along with his new duties as purchasing agent Mr. Bierly has also been appointed assistant treasurer.

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C. R. MESSINGER, chairman of the board of the Oliver Farm Equipment Co., has been elected president of the company, succeeding M. H. PETTIT, who has resigned as president and director.

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D. P. HESS, who has charge of foreign operations for the Timken Roller Bearing Co., Canton, Ohio, has sailed for Europe to spend six or eight weeks with the officials of the foreign companies associated with the Timken organization.

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H. C. ARMIN has been appointed New England sales representative, with office at 754 East Twenty-third Street, Brooklyn, N. Y., by the Michiana Products Corpn., Michigan City, Ind.

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FRANK W. CURTIS has been appointed manager of the Firthite division of the Firth-Sterling Steel Co., McKeesport, Pa. He will be in charge of engineering, sales and product development of Firthite sintered carbides and will make his headquarters at McKeesport.

FREDERICK H. LEWIS who as announced in these columns on Jan. 2 has been made district sales manager, Jones & Laughlin Steel Corpn., Pittsburgh.

WALTER L. THOMPSON, JR., new assistant district sales manager of the Jones & Laughlin Steel Corpn.

F. A. McCLELLAND, recently appointed assistant manager of the tubular sales division of the Wheeling Steel Corpn.

JOHN B. THOMAS, new assistant manager wires sales division, Wheeling Steel Corpn.

KENNETH D. MANN whose appointment as executive vice-president of the Truscon Steel Co. was announced in these columns recently.

The American System Of Enterprise

(CONCLUDED FROM PAGE 33)

despite the aberrations of political leaders and the setbacks of a world depression.

We have seen that the essential elements of this system of ours are individualism, initiative, industry and independence. Because that is so, it follows that the system itself cannot die until those four are destroyed. And that will not happen because the individualist does not want it to happen and will resist it with all his might.

Individualism and initiative are the marks of all true Americans today, as always. Not one of them would voluntarily submit to regimentation. Why, they would not even submit to the necessary discipline of the Army and Navy during the war, even though it was then a matter of life and death. Never was such an undisciplined Army as ours and never one with more dash and initiative. It is just the same now, with the body of our people.

The only classes who really want regimentation, here, are the hereditary goose-steppers, transplanted from Europe and the hordes of unfortunates whose spirits are too damaged by the economic catastrophe to care what is done to them provided they can have food and shelter. Even they would hardly submit if they had their jobs once more.

A thoughtful consideration of what the theorists who believe in domination by the State, have thus far done and left undone, leads straight to the conviction that they, at least, can never undo our traditional system of enterprise. They have, to be sure, regimented the jobless, but that would have had to be done in any event. We cannot let our people starve, nor has anyone starved through neglect during this crisis.

They have regimented certain classes of farmers, some of whom were in distress and others of whom were deficient in self-respect. Meanwhile it has been amusing to observe how carefully they have kept hands off organized labor, probably on the assumption that their efforts would be resented—to say the least.

The great majority of business men, from the proprietor of a food shop to the President of General Foods, have continued on their independent way, trying to keep the income a little ahead of the outgo, by the exercise of all the ingenuity and initiative they possess. In the beginning when codes were proposed as a method of distributing work among more persons, both Joe Aiello and Mr. Colby M. Chester did their best to cooperate. When the codes were decently interred, our typical business men shrugged their shoulders and went back to the task of trying to make a little money in the way they had learned during half a lifetime.

The same determination to make the best of it extended throughout the business and industrial establishments of the country. Because the attention of the average newspaper reader has been repeatedly focussed upon the misdeeds of this industrialist, that oil man or those bankers, he must not forget that there are thousands of men of high principle and broad humanity operating businesses, which they themselves have built from nothing by vision, grit and hard work—to make money, of course, but more especially to accomplish something in the world.

It is upon that spirit that the American system of enterprise has been reared and it is that same spirit which will see us through this crisis and others as they come. We are an extremely active, restless and ambitious people. We are constantly on edge for new things. It is typical of our individualism that the ambition of young couples starting out in life is to build a new house rather than buy an old one. They want something which is peculiarly themselves—their idea, their plan, their own.

An invention, however awe-inspiring, is no sooner completed than a whole, astounding network of manufacturing, publicizing and distributing organizations springs up almost over night. If it is something all can use, everyone wants it and, presently, prices come down and terms are arranged so that everyone can get it.

Enterprise is the word for this system—enterprise on the part of those who think up new ideas, plans and devices to make life for all more interesting, more comfortable and more useful; enterprise on the part of those who create the manufacturing system to carry out the ideas, with their money, work and machines and, enterprise on the part of the selling organizations with their genius for creating, satisfying and continuing a demand. It is in this determined spirit of the people of the nation to seek constantly and unrestingly for better and higher standards of living, that the seeds of self-perpetuation of the American system of enterprise are carried.

There is every valid reason to believe that the wheels of this great machine of ours are turning over a little faster each month. For there is a tremendous amount of lost time to be made up in all our activities. Nearly half our manufacturing plants are obsolescent and must be rebuilt; housing for two million and a half families—our five year normal growth—must be constructed; all the other things, which have been wearing out, clothes, cars, household goods, must be replaced.

Here is another flood, which has been rising steadily for more than five years, a flood of the demand of one hundred and twenty millions for all the commodities which have not been made in all that time. When it breaks loose, as it must shortly, our friend John Citizen will wonder why he ever had the faintest doubts about the invincible power of the American system of enterprise to go on adding to the wealth and happiness of the American people.

The Steubenville, Ohio, plant of the Weirton Steel Co., which has been closed for the past five months, has resumed partial operations. The plant was closed last August to allow for a modernization program which included electrification of its machinery. The plant is expected to be running at capacity within 10 days. It is a finishing mill, devoted exclusively to the production of tin plate, and employs about 1000 workers.

Capital Goods Industries Renew Active Operations

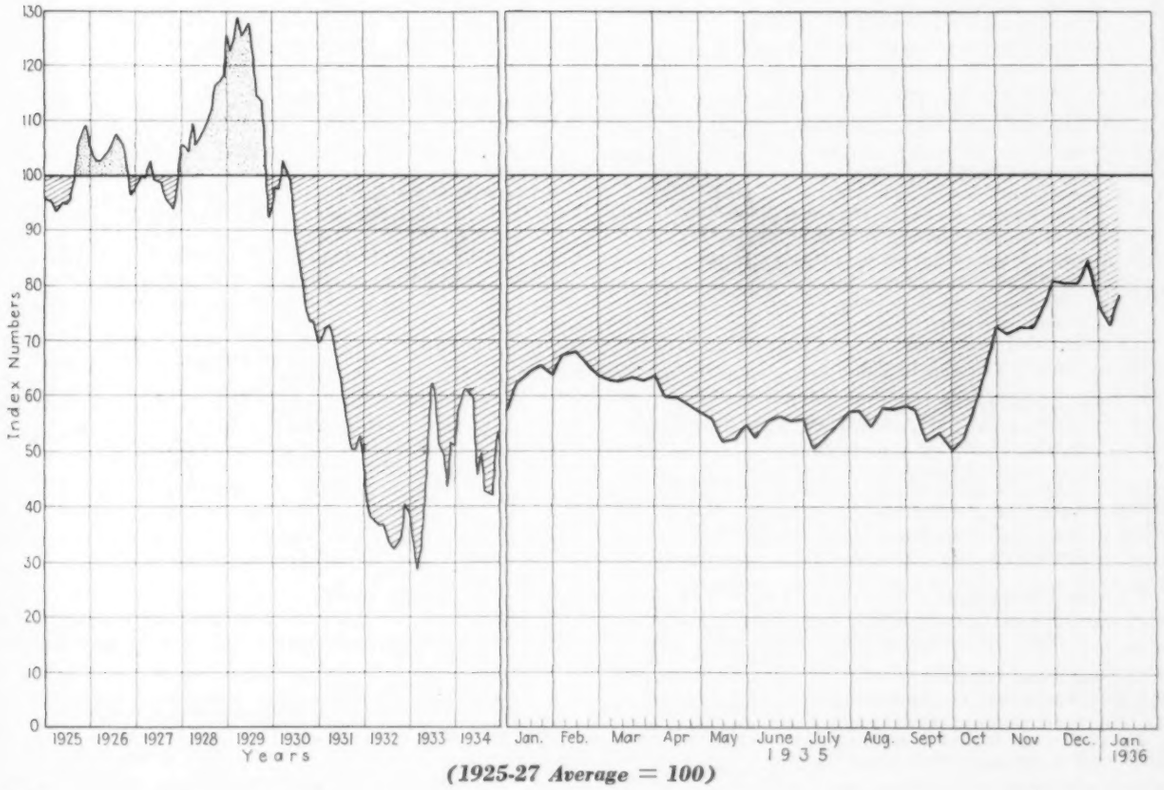
ACTIVITY in the capital goods industries has risen 5.6 points to 78.3 per cent of the base period average, as measured by THE IRON AGE index. The rise reflects concentrated improvement along a wide front. Heavier traffic in lumber, industrial gains at Pittsburgh and adjacent areas, greater output by motor car makers, and a pronounced increase in heavy engineering contract awards contributed to last week's gain in the combined index. Steel ingot production rebounded considerably, but failed to raise the adjusted steel index. Heavy construction awards, which reached $102,500,000 in the seven-day period ended Jan. 11, were larger than for any similar period since the third week in May, 1931.

Compared with this time last year, industrial operations are currently 22 per cent higher. Dissecting the evidence, it is apparent that the opening period of 1936 has given indication that business during the year will forge ahead of last year's improved status. Evidence that the construction industry will experience a marked expansion in operations is especially strong.

The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-'27 = 100)

Last week (est.)	78.3
Preceding week (rev.)	72.7
Same week last month	80.2
Same week 1935	64.2
Same week 1934	49.9
Same week 1933	38.4
Same week 1932	50.3
Same week 1931	69.2
Same week 1930	96.6
Same week 1929	126.7



The Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, by weeks since 1935.

Components of the index: Steel ingot production rate, from THE IRON AGE; revenue freight carloadings of forest products, from Association of American Railroads; automobile production from Cram's Automotive Reports; heavy construction contract awards, from *Engineering News Record;* index of productive activity in Pittsburgh district, from Bureau of Business Research of University of Pittsburgh.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	December, 1935	November, 1935	December, 1934	Year 1934	Year 1935
Raw Materials:					
Lake ore consumption (gross tons)[a]	.....	3,020,315	1,505,751	22,113,951	.....
Coke production (net tons)[b]	.....	3,217,175	2,501,441	31,830,210	.....
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,106,453	2,065,913	1,027,622	15,911,188	21,007,802
Pig iron output—daily (gross tons)[c]	67,950	68,864	33,149	43,592	57,556
Castings:					
Malleable castings—production (net tons)[d]	.....	44,277	32,746	369,458	.....
Malleable castings—orders (net tons)[d]	.....	47,778	36,505	354,146	.....
Steel castings—production (net tons)[d]	.....	36,165	23,916	450,087	.....
Steel castings—orders (net tons)[d]	.....	32,714	27,312	434,131	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	3,081,807	3,153,247	1,964,257	25,599,118	33,425,576
Steel ingot production—daily (gross tons)[e]	123,272	121,279	78,570	82,312	107,478
Steel ingot production—per cent of capacity[e]	55.68	54.78	35.68	37.38	48.55
Employment in Steel Industry:					
Total employees[e]	.....	438,370	386,345	409,349	.....
Total payrolls (thousands of dollars)[e]	.....	$49,171	$35,363	$457,848	.....
Average hours worked per week[e]	.....	35.7	27.4	30.4	.....
Finished Steel:					
Trackwork shipments (net tons)[e]	3,025	3,090	2,272	49,110	42,229
Sheet steel sales (net tons)[f]	.....	289,101	193,130	1,830,682	.....
Sheet steel production (net tons)[f]	.....	224,541	159,740	1,895,460	.....
Fabricated shape orders (net tons)[g]	.....	92,775	67,799	1,054,382	.....
Fabricated shape shipments (net tons)[g]	.....	87,833	88,687	1,116,222	.....
Fabricated plate orders (net tons)[d]	.....	19,116	26,025	241,992	.....
Reinforcing bar awards (net tons)[e]	32,150	11,475	12,661	182,351	321,465
U. S. Steel Corpn. shipments (tons)[h]	661,515	681,820	418,630	5,925,873	7,371,299
Ohio River steel shipments (net tons)[i]	.....	88,338	46,887	633,197	.....
Fabricated Products:					
Automobile production, U. S. and Canada[k]	.....	406,486	156,318	2,869,963	.....
Construction contracts, 37 Eastern States[l]	$264,136,500	$188,115,000	$92,694,900	$1,543,108,400	$1,844,544,900
Steel barrel shipments (number)[d]	.....	654,596	424,233	6,682,400	.....
Steel furniture shipments (dollars)[d]	.....	$1,591,286	$1,090,171	$11,807,843	.....
Steel boiler orders (sq. ft.)[d]	.....	464,431	259,875	4,368,563	.....
Locomotive orders (number)[m]	55	0	20	183	83
Freight car orders (number)[m]	10,571	25	1,532	24,611	18,699
Machine tool index[n]	98.3	98.6	66.1	†54.1	99.9
Foundry equipment index[o]	.....	100.4	66.9	†67.5	.....
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	56,637	19,708	316,761	.....
Imports of pig iron (gross tons)[p]	.....	15,550	3,642	115,470	.....
Imports of all rolled steel (gross tons)[p]	.....	17,089	7,548	113,354	.....
Total iron and steel experts (gross tons)[p]	.....	205,242	282,655	2,832,764	.....
Exports of all rolled steel (gross tons)[p]	.....	88,008	80,704	951,380	.....
Exports of finished steel (gross tons)[p]	.....	68,324	78,137	833,559	.....
Exports of scrap (gross tons)[p]	.....	104,961	196,361	1,835,554	.....
British Production:					
British pig iron production (gross tons)[r]	559,300	525,100	513,500	5,978,500	6,422,000
British steel ingot production (gross tons)[r]	811,500	903,300	654,500	8,859,700	9,842,400
Non-Ferrous Metals:					
Lead production (net tons)[s]	.....	39,957	37,217	412,298	.....
Lead shipments (net tons)[s]	.....	43,023	34,680	313,365	.....
Zinc production (net tons)[t]	40,136	37,469	35,685	366,933	431,085
Zinc shipments (net tons)[t]	41,466	48,172	31,707	352,663	465,154
Deliveries of tin (gross tons)[v]	5,360	4,035	4,530	46,215	59,110

*Preliminary. †Three months' average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corpn.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [l] F. W. Dodge Corpn.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Mixed Trends Obscure Outlook In Iron and Steel Market

Large Orders for Heavy Rolled Products and Rise in Scrap Index Are Reassuring—Automobile Schedules Are Uncertain, Death of AAA Is Depressing Influence

MIXED trends obscure the outlook in the iron and steel market. Negative factors include uncertainty as to the course of automobile production, business hesitancy growing out of the AAA decision and a drop of 10 points to 60 per cent in tin plate output. Reassuring factors embrace a rise in orders for rails and other heavy rolled products, an increase in steel purchases by farm equipment makers and an advance in THE IRON AGE scrap price index from $13.33 to $13.42 a ton, putting it on a parity with the high for 1935, reached early in December.

Conflicting tendencies also are to be noted in steel works operations, though the national ingot rate remains unchanged at 51 per cent of capacity. Output is down two points to 37 per cent at Pittsburgh, five points to 40 per cent at Buffalo, and two points to 55 per cent at St. Louis, but has risen two points to 52 per cent at Chicago, three points to 65 per cent in the Valleys and four points to 42 per cent in the South. The Philadelphia district remains at 39 per cent, the Cleveland-Lorain area at 61 per cent, the Wheeling district at 72 per cent, the southern Ohio River region at 82 per cent and Detroit at 95 per cent.

ORDERS from three roads for rails and track supplies total 62,569 tons. The Southern Pacific bought 40,769 tons of rails and 10,000 tons of accessories, the Illinois Central closed for 7600 tons of rails, and the Southern Railway System, which purchased 10,000 tons of rails last November, placed supplementary orders for 3000 tons of rails and 1200 tons of tie plates and other accessories. The New York Central is expected momentarily to issue a formal inquiry for 35,000 tons of rails, and the Chicago & North Western, the Milwaukee Road and the Rock Island are preparing estimates of their requirements.

Part of the 110,000 tons of steel needed for the Pennsylvania's 10,000-car program will soon be released for rolling, and the mills also look for support from the impending Bessemer & Lake Erie and Union Railroad purchase of 3000 cars, the steel requirements of which are now estimated at 45,000 tons, not including 12,000 axles and 24,000 wheels.

CONSPICUOUS among awards of construction steel is the placing of 47,581 tons of plates, shapes and reinforcing bars by the Los Angeles water district. For one project alone, a 16.47-mile unit of the Colorado River aqueduct, 38,661 tons of steel was purchased.

Structural steel lettings, at 25,200 tons, compare with 13,650 tons in the previous week. New projects total 8325 tons as against 17,850 tons a week ago.

THE death of the AAA has thrown a damper on demand for mill products from agricultural areas but a conviction that farmer buying will quickly revive is reflected in a further increase in purchases of steel by farm implement manufacturers.

Automobile output has undergone a slight recession and large sheet orders which motor car makers had been expected to place have thus far failed to materialize. Tentative assembly schedules for the future are still high, but the actual course of production will depend on the solution of the highly troublesome used car problem.

The decline in tin plate output mirrors the apparently well bought position of most buyers on general line requirements and the heavy stocks in mills' hands.

PIG IRON buying is at a low rate following the heavy anticipatory purchases in the fourth quarter, but in the Great Lakes region consumption is well maintained and shipments are running as high as 60 per cent of the December rate.

Scrap prices have been bolstered in various centers by sizable consumer purchases. At Pittsburgh, No. 1 heavy melting steel was sold at $14.75 a ton, delivered, an advance of 25c. a ton over the last mill purchase. In New England, pressure for export scrap is unrelieved.

Steel prices show little change beyond an extension of the $3 a ton concession on cold-rolled and hot-rolled annealed sheets, prevalent of late in the Detroit district, to certain Ohio stamping plants making automobile parts.

Quantity extras have been adopted for hot-rolled alloy steel bars, replacing the previous lump sum extras and resulting, in some cases, in advantage to the buyer.

THE IRON AGE composite prices for finished steel and pig iron are unchanged at 2.130c. a lb. and $18.84 a gross ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Jan. 14, 1936	Jan. 7, 1936	Dec. 17, 1935	Jan. 15, 1935
No. 2 fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$20.26
No. 2, Valley furnace	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace	19.00	19.00	19.00	18.00
Malleable, Chicago*	19.50	19.50	19.50	18.50
Malleable, Valley	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago	25.2528	25.2528	25.2528	24.04
Ferromanganese, seab'd carlots	75.00	75.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	29.00	29.00	29.00	27.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	28.00
Slabs, Pittsburgh	29.00	29.00	29.00	27.00
Forging billets, Pittsburgh	35.00	35.00	35.00	32.00
Wire rods, Pittsburgh	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.85	1.85	1.85	1.80
Bars, Chicago	1.90	1.90	1.90	1.85
Bars, Cleveland	1.90	1.90	1.90	1.85
Bars, New York	2.20	2.20	2.20	2.13
Plates, Pittsburgh	1.80	1.80	1.80	1.80
Plates, Chicago	1.85	1.85	1.85	1.85
Plates, New York	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06¼	2.06¼	2.06¼	2.05¼
Cold-finished bars, Pittsburgh	2.10	2.10	1.95	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

Finished Steel

Per Lb.:	Jan. 14, 1936 Cents	Jan. 7, 1936 Cents	Dec. 17, 1935 Cents	Jan. 15, 1935 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh	2.40	2.40	2.40	2.60
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., P'gh	2.80	2.80	2.80	3.00
Barbed wire, galv., Chicago dist. mill	2.85	2.85	2.85	3.05
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.50	$14.25	$14.25	$13.50
Heavy melting steel, Phila.	12.50	12.50	12.50	11.75
Heavy melting steel, Ch'go	13.25	13.25	13.25	11.75
Carwheels, Chicago	13.25	13.25	13.25	12.00
Carwheels, Philadelphia	13.00	13.00	13.00	10.75
No. 1 cast, Pittsburgh	14.25	14.25	14.25	12.75
No. 1 cast, Philadelphia	13.00	13.00	13.00	11.00
No. 1 cast, Ch'go (net ton)	12.00	12.00	11.75	11.00
No. 1 RR. wrot., Phila.	12.25	12.25	12.25	11.25
No. 1 RR. wrot., Ch'go (net)	11.00	11.00	11.00	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.65	$3.65	$3.50	$3.85
Foundry coke, prompt	4.25	4.25	4.00	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	9.25	9.25	9.00	8.75
Lake copper, New York	9.37½	9.37½	9.37½	9.12½
Tin (Straits), New York	47.75	46.87½	49.87½	50.55
Zinc, East St. Louis	4.85	4.85	4.85	3.75
Zinc, New York	5.22½	5.22½	5.22½	4.10
Lead, St. Louis	4.35	4.35	4.35	3.55
Lead, New York	4.50	4.50	4.50	3.70
Antimony (Asiatic), N. Y.	12.62½	13.75	14.50	14.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prics on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Jan. 14, 1936	2.130c. a Lb.	$18.84 a Gross Ton	$13.42 a Gross Ton
One week ago	2.130c.	18.84	13.33
One month ago	2.130c.	18.84	13.33
One year ago	2.124c.	17.90	12.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1935	2.130c., Oct. 1	2.124c., Jan. 8	$18.84, Nov. 5	$17.83, May 14	$13.42, Dec. 10	$10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Ingot Rate Dips to 37 Per Cent

Valley Operations Rise to 65 Per Cent and Wheeling Average Holds at 72 Per Cent — Steel Scrap Advances

PITTSBURGH, Jan. 14.—Recovery from holiday sluggishness has received a minor setback in the Pittsburgh district this week, when operations will average two points lower at 37 per cent of capacity. This trend is believed to be only temporary, since there is enough forward business on books and in prospect to assure further recovery early in the first quarter. Some hesitancy is reported in demand from agricultural areas, which are now unwinding from the entanglements of the defunct AAA. Specifications for flat-rolled steel from the automobile industry and miscellaneous sources here also are lighter, but retrenchments in buying are partly ascribable to post-inventory influences.

In the Youngstown-Canton-Massillon district a reverse trend is in progress. Operations there have risen three points to 65 per cent of capacity, topping any week's record for 1935. Demand in that area is strong for flat-rolled steel, notably strip, and shipments of standard pipe for consignment are heavy. Production in the Wheeling district is holding its own at 72 per cent.

A bullish indication in the Tri-State district is the further strength of scrap which has risen at Pittsburgh and Youngstown.

Pig Iron

January tonnage is not shaping up so well, with few orders coming in at the new prices. Demand since the beginning of January is well below that in the same period in December. Foundry melt is at a fair rate but is not accounting for any sharp inroads into stocks, which now appear likely to suffice at least through January.

Semi-Finished Steel

The higher prices announced in fourth quarter remain almost entirely nominal. In no case has it been established that a large buyer of semi-finished materials is covered for any part of first quarter at the new quotations, and considerable pressure continues from some large non-integrated mills against paying more money until a so-called better balance is established between semi-finished and finished prices. In the event that producers remain adamant in their present price position, specifications this month against low-priced orders are likely to expand measurably. Sheet bar volume is leading the present movement.

Bars

Demand lacks zest. Volume in the fore part of January is not quite matching that for the like period in December, but producers here are looking forward to a pick-up after mid-Januay. The focal point of expectations is in increased railroad equipment buying, with further assistance expected from agricultural implement makers, whose production schedules, while not currently calling for an unusually heavy volume of bars, are pointed toward increased requirements. Open disturbances in the 1.85c. Pittsburgh base quotation are few. The quantity differential schedules appear to be working satisfactorily.

Rails and Track Accessories

No new important inquiries have reached this market in the past week. The local rail mill probably will not roll any rail tonnage this week.

Bolts, Nuts and Rivets

Business still shows the effect of anticipatory buying in December, although in the face of all circumstances orders are regarded as being satisfactory. Demand is largely miscellaneous in character. The automobile makers have reduced their takings of bolts and nuts. No important tonnage has thus far been placed for railroad car building. New discounts effective on Jan. 1 are largely nominal.

Reinforcing Steel

The trend in demand shows little variation, with public works the dominant factor. The Federal dam project at Fort Peck, Mont., will call for about 5000 tons, while projected hangars and quarters at Pensacola, Fla., will take about 1500 tons. Concessions on material for public works are still widespread, with no indications of any firming in distributors' quotations.

Cold-Finished Bars

Mills are depending pretty largely for January production on tonnage booked in December at the old prices. New business is appearing in small volume with tonnage well diversified. Demand from agricultural implement makers, while not heavy, shows improvement. Output for the cold-finished bar industry is estimated at 50 to 55 per cent of capacity. The new base price of 2.10c., Pittsburgh, is largely nominal and probably will remain so until completion of fourth quarter commitments on Jan. 31.

Plates and Shapes

Bids taken recently on 10 steel coal barges for the Pittsburgh Coal Co. covered such varied designs that the company has readvertised for new bids to cover a uniform design of its own conception. The projected bottoms will require about 1500 tons of plates and small shapes. Repair work is not accounting for a great deal of plate consumption at present, but the season for this work, as well as new construction, is not far off. Rolling of plates for Pennsylvania freight cars has not yet begun. Tank work and boiler construction are not active.

Fresh structural steel inquiries and awards in the past week were in moderate volume. New projects are featured by an express highway in New York and a public school in Brooklyn, requiring 1700 and 1000 tons respectively. Awards included two sizable projects, one for 2600 tons for a milk distribution depot at Richmond Hill, New York, to Bethlehem Steel Co., and the other for 4200 tons for a highway bridge at Weldon Springs, Mo., to Stupp Brothers Bridge & Iron Co.

Little change can be perceived in fabricating prices, which fluctuate according to the competitive features of each project.

Tubular Goods

The trend in demand is even, with volume about the same as that in the early part of December. A better feeling exists among large shippers of oil country goods because of the recent advance in some oil prices, which are expected to permit larger expenditures for drill pipe, casing and other oil field items. Seamless and welded mechanical tubing is moving in small volume for automotive consumption, while shipments of standard pipe are largely for consignment replenishments. Prices remain firm.

Sheet Steel Piling

Specifications against the recently awarded Miami harbor improve-

ment project have been received here, and producers will make early shipments. The United States Engineer Office at Fort Peck, Mont., is taking bids on 355 tons for the Fort Peck dam. The Bureau of Reclamation is expected this month to invite bids for a large quantity of piling for the Imperial Valley project.

Wire Products

This market has recouped some of the holiday losses in tonnage, and orders are coming in faster than they were in December. Merchant items are benefiting by activity in some sections of the country, notably in the Southwest and Southeast, not affected by winter conditions. Manufacturing trade is good, although at the present rate of shipments to the automobile industry, automobile orders of manufacturers' wire probably will run about 20 per cent less in January than those in December. Wire output in this district is running about 40 to 45 per cent.

Sheets

Specifications in the past week were light from practically all sources. Buyers are displaying some hesitancy about placing new orders, excepting for immediate requirements. This tendency is noticeable particularly in areas affected by the Supreme Court's decision on the AAA, although the slackening of business may to a large extent be merely coincidental with that decision. The jobbing trade is quiet, probably owing to a natural post-inventory position. Fewer irregularities in quotations for galvanized are reported. Competition on cold-rolled sheets, while no severer than it was early in December, is still keen in automobile centers. Operations are holding at 65 per cent of capacity, but unless new specifications and orders for early shipment appear in better volume, present backlogs will not be sufficient to support that rate beyond the current period.

Tin Plate

Specifications are coming in intermittently, and the apparently well-bought position of most buyers on general line requirements, together with heavy stocks in mill hands, is beginning to adversely affect mill schedules, which this week will be 10 points lower at 60 per cent of capacity. Requirements of tin plate for beer cars have lost none of their importance, but the volume of such business is expanding rather slowly.

Strip Steel

New business since Jan. 1 has appeared slowly. The slackening, which at first was traceable to automobile demands, is now evident on a broader front. Inventory taking and other year-end influences still are considered to be the only deterrents, and a pick-up is believed in prospect for the second half of January. Makers of business machines are showing slightly more active interest. Hot mill schedules are sustained at about 50 per cent.

Coal and Coke

Demand for domestic-sized bituminous coal is well sustained by severe weather. The same cannot be said to apply to industrial sizes, which seem to be ignored by important buyers for the time being. Demand for beehive furnace, foundry and domestic coke is only fair, but prices are definitely firm. Beehive coke is relatively scarce, when compared with the profusion of other fuel available. The number of productive beehive furnaces seems to be declining, since many ovens are being abandoned and others, in extremely poor condition, face the same fate.

Scrap

This market has absorbed further strength on additional consumer buying and the continued scarcity of available supplies. No. 1 heavy melting steel has been sold at $14.75 delivered, an advance of 25c. a ton over the last consumer purchase. Other steel grades have moved sympathetically higher. Another indication of strength was the reported disposition of heavy melting steel on the last Pennsylvania Railroad list at around $15.25, delivered Pittsburgh district and Johnstown. Brokers with unfilled orders are picking up small quantities of No. 1 heavy melting steel at $14.50 and $14.60. Sizable purchases of No. 1 and No. 2 steel have been made in the Youngstown district. Prices paid there for No. 1 steel range from $14.50 to $15, with $14.50 ruling on the No. 2 grade.

Metal Congress to Be Held at Cleveland

THE National Metal Congress and the annual meeting of the American Society for Metals and other societies that have concurrent programs will be held in Cleveland Oct. 19 to 23 inclusive. The exposition and technical sessions will take place in the Public Auditorium.

Organizations that will hold their annual meetings in Cleveland at the same time include the American Institute of Mining & Metallurgical Engineers (Iron and Steel Division), American Welding Society, and the Wire Association.

Weekly Indications of Steel Activity

From THE IRON AGE

	Jan. 14, 1936	Jan. 7, 1936	Dec. 17, 1935	Jan. 15, 1935	Average Year to Date 1936	Average Year to Date 1935
Steel ingot operations—Per cent of capacity	51.0	51.0	55.5	49.0	50.1	45.3

	Week Ended Jan. 14, 1936	Jan. 7, 1936	Dec. 17, 1935	Jan. 15, 1935	Year to Date 1936	Year to Date 1935
Fabricated structural steel awards	25,200	13,650	24,400	9,750	37,850	37,950
Fabricated plate awards	31,635	12,112	24,015	1,050	43,747	7,450
Sheet steel piling awards	0	3,600	2,500	2,900	3,600	4,300
Reinforcing bar awards	23,700	2,750	15,700	4,100	26,450	8,850

Production Up Two Points To 52 Per Cent at Chicago

Uncertainty Following AAA Decision Fails to Check Demand From Implement Industry—Illinois Central Buys Rails

CHICAGO, Jan. 14.—Ingot output in this district started the new week at a slightly lower rate than that which was reached at the end of last week. However, the net result is a gain of about two points, the average now being 52 per cent of capacity.

All eyes are centered on the death of AAA and its effects on farmer buying. A very significant fact is that steel purchases by farm implement manufacturers are actually increasing and no production schedules have been cut. Further, there are many in that industry who prophesy that 1936 will be even a better year than they foresaw near the end of the old year. The consensus of opinion is that if farm prices do not go lower the situation is safe. Also, there is strong probability of a substitute measure which may bring some cash benefit to the farmer.

Naturally not all parts of the country are affected alike. In the East and Northeast, Government cash payments amounted only to 1.2 per cent of the farmers' total cash receipts and, in that area, the elimination of AAA benefits will have very slight bearing on the farmers' buying power if farm commodity prices hold near present levels. A quick survey is now being made in the Middle West, but its outcome seems not to be such as to deter farm implement manufacturers from making future plans, in some cases for as long as about six months. It is pointed out by some that the elimination of the processing tax is bringing higher returns to the hog raiser while pork prices are lower, indicating that both the farmer and the consumer are benefiting by the decision.

The purchase of rails by the Illinois Central and the award of 4500 tons of structural materials for additional mill buildings for expansion of the Inland Steel Co. are highlights of the local steel market.

Pig Iron

Sales remain steady and are in fair spot volume, considering that many consumers have stocks that are ample for January and part of February. Shipments continue on the rebound from the holiday lull.

Reinforcing Bars

This market is moderately active and prospects are good, but there is almost a total absence of private work. There is much confusion in Wisconsin, where many public jobs did not meet laws as to competitive figures and the forms in which bids must be entered. The result is that many small projects, totaling close to 700 tons, are being rebid. The Oak Park, Ill., sewer, which was rebid, has been awarded in three sections and contractors are placing orders for a total of 700 tons of bars. Prices for reinforcing bars are again under extreme pressure and variations are wider now than in many months.

Cast Iron Pipe

All activity centers in Government spending, and for the most part tonnages required are small. In some cases where bids exceeded estimates paring can be done so that contracts can be let and materials ordered. However, on a vast number of projects it has become necessary to refigure. Cast iron pipe prices remain strong. Official notices of advances are absent, but it is generally felt that the foundation has been laid for higher quotations.

Rails

The Illinois Central has ordered 7600 tons of rails, the orders having been taken by Carnegie-Illinois, Inland and the Tennessee company. No actual inquiries are now before the trade, but it is known that the Chicago & North Western, the Milwaukee Road and the Rock Island are preparing figures on needs. Rail mills that have been down since the start of the holiday period are resuming operations. Accessory orders are lighter, amounting to about 1200 tons. Quotations are being entered on the accessory needs of the Illinois Central.

Plates

Improvements along the line of oil refining processes are bringing the petroleum industry into the steel market. Several new refinery projects are now under way and others are planned for the new year. Many of these also call for some pipe tonnage for oil lines.

Railroad equipment accessory manufacturers report that business is better, but orders are for the most part for repairs rather than the lump business that is placed with new equipment orders. Their experience reflects the efforts the railroads are making to keep old equipment in serviceable condition. Miscellaneous use of plates remains light and there are no real bright spots on the horizon.

Sheets

Price variations are beginning to flare up here and there, but so far the market shows nothing more than the beginning of unsettlement which, as conditions now stand, has an even chance of disappearing without serious damage. Production remains at a high level and, though orders have increased since the holidays, they do not match shipments and order books are growing lighter.

Wire Products

The business rebound is still in effect and sellers look for it to climb to higher levels. The fact of the matter is that January has started more auspiciously than the first month in many years and also is fully equal to the best start made in any month in 1935. The bulk of the gain comes from the manufacturing trade in which there is now noticeable a coming to life of many small concerns that have been dormant for years. Jobbers are beginning to loosen their purse strings, though no rush is expected from them until near the break of winter weather. Mill operations remain steady, but they may be advanced at any time. Nail prices are showing variations.

Bars

This commodity is making an exceptionally good showing and releases continue to climb. The automobile industry is taking the leadership, but the miscellaneous trade is also expanding. Farm implement manufacturers, contrary to what might be expected following the death of AAA, are now planning to enlarge 1936 production schedules, and they are already placing some of the additional steel requirements. They expect soon to

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Standard and Special Drop Forged **WRENCHES**

With 51 types always in stock . . . all millings, all sizes from tiny miniatures to great 2-man wrenches . . . there are standard ARMSTRONG WRENCHES readily available to meet any normal industrial requirement. And, for those special demands, calls for special wrenches and special millings, an ample stock of forged wrench blanks is maintained to assure delivery on short notice.

ARMSTRONG Wrenches are quality wrenches drop forged from special analysis high carbon steel, improved in designs, in proportions and balance. They are heat treated, hardened and finely finished in black backed enamel with heads ground bright and plainly marked for size. They are stronger, finer tools, still cost no more than other quality wrenches.

51 *Standard Types with*

opening milled for
U. S. Standard
American Standard
S.A.E. Standard
WHITWORTH Standard and Metric Standard

Write for Wrench Catalog W-35

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. Francisco Ave., Chicago, U.S.A.
New York San Francisco London

attain 80 per cent of capacity or better and to hold that rate for about the first six months.

Structural Material

Outstanding among structural awards is 4500 tons placed by Inland Steel Co. for new structures that will house three new open-hearth furnaces and a new blooming mill. Practically all other business consists of scattered tonnages that total about 2500 tons. There is nothing startling in the fresh inquiry column, which consists almost wholly of bridges in Illinois and Oregon.

Scrap

Speculation is taking a grip on this market, the undertone of which continues to grow stronger. Dealers, in almost a frantic effort to cover old commitments, readily pay railroads over $14 a ton for heavy melting steel and dealer trades are reported close to the same figure. Although the weather has been and still is a factor, it cannot be denied that supplies are none too free. There is a strong possibility of mill purchases in the very near future.

Gould Storage Battery Corpn. has moved its eastern sales office and service depot from 796 Tenth Avenue to 549-551 West Fifty-second Street, New York. E. R. Jacobsen, eastern sales manager, is in charge of all sales and service activities along the Atlantic Seaboard, including the New England States.

OBITUARY

WOODWARD J. HULL, secretary to the superintendent of Homestead, Pa., works, Carnegie-Illinois Steel Corpn., died suddenly at Munhall, Pa., on Jan. 4. He had been secretary to various executives of the company, including A. R. Hunt and A. A. Corey, both deceased.

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SYDNEY G. PLUMMER, for several years president of the Pacific Coast Engineering Co., died at his home at Oakland, Cal., on Jan. 4. Although only a young executive of 44 years, he has long been an outstanding consulting engineer on the Pacific Coast.

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JACK ESPEN, a member of the firm of Espen-Lucas Machine Works, Philadelphia, died on Dec. 22.

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JOHN B. SINGER, for 26 years superintendent of the roll department of the Algoma Steel Corpn., Sault Ste. Marie, Ontario, died in that city on Dec. 26, aged 64 years. He started in the steel industry at the age of 19 in the roll shop of the Pennsylvania Steel Co., now the Bethlehem Steel Corpn., and remained until 1909, when he became identified with the Algoma Steel Corpn.

WALLACE THOMPSON, editor of *Ingenieria Internacional*, died at his home in New York on Jan. 7, after a long illness. He joined the Business Publishers International Corpn. in 1927 after a long career in newspaper, publishing and governmental work.

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ARTHUR W. WALKER, president of Walker & Pratt Mfg. Co., Watertown, Mass., died at his home in Malden on Jan. 4, aged 75 years. He was graduated from the Massachusetts Institute of Technology in 1882. Mr. Walker was president of the American Foundrymen's Association in 1902-03 and a past-president of the New England Stove Association.

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WILLARD NEWTON SAWYER, who for 10 years served as president of the Wellman-Seaver-Morgan Co., Cleveland, now the Wellman Engineering Co., died in Kent, Ohio, Jan. 5, aged 73 years. He retired from the presidency of the company in 1917 because of poor health and had since lived in Kent.

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DANIEL B. KIRBY, formerly superintendent of the Cuyahoga works of the American Steel & Wire Co., Cleveland, died Jan. 1, aged 77 years. He retired 12 years ago.

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ERNEST WALES WHITTEMORE, formerly secretary - treasurer of the National Malleable & Steel Casting Co., Cleveland, died in that city Dec. 25, aged 59 years. A native of Rye, N. Y., he became affiliated with the National Malleable Company in 1898 upon his graduation from Yale University. He resigned as secretary-treasurer of the company a year ago because of poor health.

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WILLIAM F. STEGEMAN, president of the Stegeman Machinery Co., Milwaukee, builder of special machinery and tools, died Dec. 27, aged 49 years. Prior to forming his own company he was associated with his brother, Oscar Stegeman, in the former Stegeman Motor Truck Co., Milwaukee, a pioneer in the commercial vehicle industry.

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JOHN WILLIAM PILLING, president and treasurer of the Baltimore Brass Co., Baltimore, died in that city on Dec. 29.

Reinforcing Steel

Awards 23,700 Tons—New Projects 11,000 Tons

AWARDS

State of New Jersey, 1300 tons, approach to Hudson Midtown tunnel, to Truscon Steel Co., through George M. Brewster, general contractor.

New York, 786 tons, State Procurement Division of Treasury, to W. Ames & Co.

New York, 1100 tons, Wards Island sewage disposal plant, to Bethlehem Steel Co.

Muskegon, Mich., 400 tons, waterworks, to an unnamed bidder.

Hammond, Ind., 100 tons, two school buildings, to an unnamed bidder.

State of Illinois, 325 tons, bridge, to Calumet Steel Co.,

Chicago, 200 tons, Ogden Avenue improvement, to an unnamed bidder.

Chicago, 100 tons, post office at Stock Yards, to Calumet Steel Co.

Winnetka, Ill., 126 tons, Cherry Street sewer, to Concrete Steel Co.

Oak Park, Ill., 500 tons, sewer, to an unnamed bidder.

Tempe, Ariz., 150 tons, dormitory at Teachers College, to Truscon Steel Co.

Butte, Mont., 270 tons, school, to Bethlehem Steel Co.

San Francisco, 113 tons, State overhead crossing at Williams Street, to Bethlehem Steel Co.

Calwa, Cal., 513 tons, State overhead crossing, to Bethlehem Steel Co.

Los Angeles, 150 tons, hospital, to Soule Steel Co.

Fullerton, Cal., 200 tons, building at Junior College, to Blue Diamond Corpn.

Anaheim, Cal., 200 tons, storm drains, to Blue Diamond Corpn.

Glendale, Cal., 120 tons, alterations at Herbert Hoover high school, to Graham Brothers.

Los Angeles, 1256 tons, material for Treasury Department, Invitation No. 2484, to Blue Diamond Corpn.

Wilmington, Cal., 200 tons, State overhead crossing, to Concrete Engineering Co.

Los Angeles, 8750 tons for 16.47 mile unit of Colorado River aqueduct, placed by American Concrete & Steel Pipe Co. with unnamed company reported to be Columbia Steel Co., though unconfirmed.

Los Angeles, 6661 tons, Specification 137 for Colorado River aqueduct, to American Concrete & Steel Pipe Co.

San Diego, Cal., 160 tons, air station, to Security Materials Co.

NEW REINFORCING BAR PROJECTS

Burlington County, N. J., 700 tons, State highway; John Lafferty, Haddon Heights, N. J., low bidder.

State of New Jersey, 700 tons, State highway; George M. Brewster, Bogota, N. J., low.

Pensacola, Fla., 1500 tons, hangars and quarters.

Fort Peck, Mont., 5000 tons, Federal dam project.

Chicago, 500 tons, sewers Nos. 4 and 5 for Sanitary District, S. A. Healy, general contractor.

Chicago, 300 tons, sewer for Sanitary District; McKay Engineering & Construction Co., general contractor.

Chicago, 625 tons, sewer No. 14 Sanitary District; Underground Construction Co., general contractor.

Grand Junction, Colo., 198 tons, State overhead crossing; bids opened.

Tucson, Ariz., 435 tons of bars and shapes, science building at University of Arizona; bids opened.

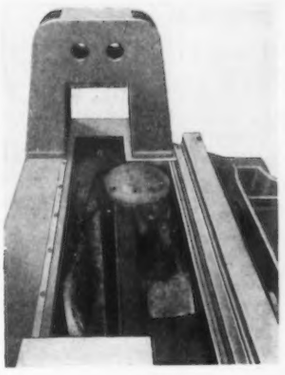
State of Idaho, 122 tons, bridges in three counties; bids Jan. 17.

San Francisco, 150 tons, shop building at George Washington high school; bids opened.

San Diego, Cal., 760 tons, material for Treasury Department under Invitation No. 12-155; bids opened.

TRIPLE COMPRESSION

SCRAP BALERS



STYLE

100 TC

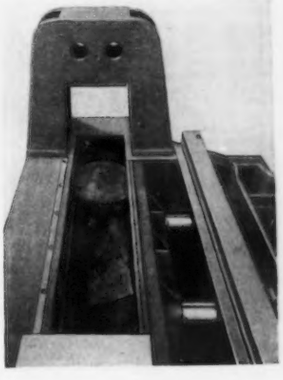
(100 x 51 x 36)

and other sizes

Also Regular

Double Ram Presses

in all sizes



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COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

Display of Measuring Standards Is Held

A HISTORIC display of measuring standards ranging from a replica of the famous "octagonal standard yard" of King Henry VIII of England to the famous Johansson gage blocks of modern day industry capable of measuring to millionths parts of an inch, was one of the show places of the annual exhibit in connection with the annual convention of the American Association for the Advancement of Science held recently in St. Louis.

The display, presented by the Johansson Division of the Ford Motor Co., included also other old measuring devices such as replicas of the Exchequer Standard Yard of Queen Elizabeth, and early measuring instruments employed from 1740 to 1800. Some of the first measuring devices of C. E. Johansson, inventor of the Johansson block system, and various sets of gage blocks and accessories, also were shown.

As a result of evolution of the Johansson gages, industry now is able to measure in millionths parts of an inch, thus bringing about the realization of mass production of mechanical parts precisely sized, and permitting the volume production of automobiles. The Ford car, for example, has 31 points of contact in which tolerances of less than ten-thousandths of an inch are required.

The gage blocks are rectangular pieces of tool steel, hardened, ground, stabilized and finished to an accuracy, one, two, four or eight millionths part of an inch, according to requirements. With these gages it is possible to measure in terms 15,000 times finer than a human hair.

Republic Steel Corpn. has closed the tin plate plant of the N. & G. Taylor Co., Cumberland, Md., which it acquired when it took over the Corrigan, McKinney Steel Co. Orders will be filled from the Warren, Ohio, plant of the Republic corporation.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel — *Base per Lb.*

F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Duluth	2.00c.
Del'd Detroit	2.00c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
Del'd Philadelphia	2.16c.
Del'd New York	2.20c.
F.o.b. Birmingham	2.00c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars Pacific ports	2.40c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

Base per Net Ton

F.o.b. Pittsburgh	$54.00
F.o.b. Chicago	54.00
F.o.b. Duluth	55.00
F.o.b. Cleveland	54.00
F.o.b. Birmingham	57.00
F.o.b. Houston, Orange, Beaumont, Galveston	63.00
F.o.b. Mobile	62.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	63.00
F.o.b. cars dock Pacific ports	67.00

Plates

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.99c.
Del'd New York	2.09c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.16c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.10c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.45c. to 2.60c.
No. 24, del'd Phila.	2.71c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, f.o.b. Detroit	2.55c. to 2.70c.
No. 10 gage, del'd Phila.	2.81c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.00c. to 3.15c.
No. 20 gage, del'd Phila.	3.26c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.41c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. cars dock Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Gary	3.20c.
No. 20, f.o.b. Birmingham	3.70c.
No. 20, f.o.b. cars dock Pacific ports	3.70c.
No. 10, f.o.b. Pittsburgh	2.50c.
No. 10, f.o.b. Gary	2.60c.
No. 10, f.o.b. Birmingham	3.10c.
No. 10, f.o.b. cars dock Pacific ports	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific Coast ports	3.35c.

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.56

Hot-Rolled Hoops, Bands, Strips and Flats under ¾ In.

Base per Lb.

All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

Base per Lb.

F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.86c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade — *Per Lb.*

Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

Base per Keg

Standard wire nails	$2.40
Smooth coated nails	2.40

Base per 100 Lb.

Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.10
Galvanized staples	3.35
Barbed wire, galvanized	2.80
Twisted barbless wire	2.80
Woven wire fence, base column	61.00
Single loop bale ties, base column	53.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth, which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

Off List

F.o.b. Pittsburgh	45 off
F.o.b. Chicago	43½ off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	51½	20½	⅛	+91½	+138
¼ to ⅜	53½	35	¼ & ⅜	+1½	+21½
½	58½	47	½	31½	15
¾	62	52	¾	36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

¼	48½	33½	¼	+13	+45½
¼ to ⅜	51	38	¼ & ⅜	+2½	+34½
½	56½	47½	½	32½	17½
¾	61	52	¾	37½	22½
1 to 3	63	55	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	62	54	2½ to 4	45½	33
3½ to 6	65½	57½	4½ to 6	45	33½
7 and 8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
11 and 12	62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.69	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.22
1⅝ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2¼ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5%
12,000 lb. or ft. to 24,999 lb. or ft.	12½%
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

Lapweld Steel and Knobbled Charcoal Iron Pressure Tubes

(Net base prices per 100 f.o.b. Pittsburgh, in carload lots)

		Steel	Iron
1¼ in. o.d.	13 B.W.G.	$ 9.72	$20.16
1¾ in. o.d.	13 B.W.G.	11.06	21.81
2 in. o.d.	13 B.W.G.	12.38	17.23
2¼ in. o.d.	13 B.W.G.	13.79	19.58
2½ in. o.d.	12 B.W.G.	16.58	24.19
2¾ in. o.d.	12 B.W.G.	17.54	26.40
3 in. o.d.	12 B.W.G.	18.35	28.39
3¼ in. o.d.	11 B.W.G.	21.56	33.95
3½ in. o.d.	11 B.W.G.	23.15	36.16
4 in. o.d.	10 B.W.G.	28.66	45.36
4½ in. o.d.	10 B.W.G.	35.22	56.48
5 in. o.d.	9 B.W.G.	44.25	61.86
6 in. o.d.	7 B.W.G.	68.14	102.46

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5%
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½%
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25%
Under 2,000 lb. or ft.	plus 40%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in. Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, $3 extra.	

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39, Birmingham, and $47.40, delivered Chicago, and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	$2.60
Spikes, ½ and smaller	2.60
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.00
Track bolts, no jobbers, all sizes (per 100 counts)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. x 6 in. and smaller..70, 10 and 5
Larger than ½ in. .....70 and 10
Lag bolts .....70 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads .....70 and 10
Hot-pressed nuts, blank or tapped, square .....70 and 10
Hot-pressed nuts, blank or tapped, hexagon .....70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped .....70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl. 1 in. diameter .....60, 20 and 15
Larger than 1 in. diameter..60, 20 and 15
Stove bolts in packages, Pittsburgh 72½ and 10
Stove bolts in packages, Chicago, 72½ and 10
Stove bolts in packages, Cleveland, 72½ and 10
Stove bolts in bulk, Pittsburgh.....82½
Stove bolts in bulk, Chicago.....82½
Stove bolts in bulk, Cleveland.....82½
Tire bolts 55

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....$2.90
F.o.b. Chicago 3.00
F.o.b. Birmingham 3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70 and 5
F.o.b. Cleveland .....70 and 5
F.o.b. Chicago and Birm'g'm.....70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller..... 75
Milled headless set screws, cut thread ¾ in. and smaller 75
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. and smaller.. 85
Upset set screws, cut and oval points .....75 and 10
Milled studs .....65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped .....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base .....2.45c.
Delivered price at Detroit is.....2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1¼% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel.....	base
6100 Chromium Vanadium Bar...	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped ....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham
Uncropped .....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham

Per Gross Ton

Rerolling $29.00
Forging quality 35.00

Delivered Detroit

Rerolling $32.00
Forging 38.00

Billets Only F.o.b. Duluth

Rerolling $31.00
Forging 37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....$30.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved ..... 1.80c.
Universal ..... 1.80c.
Sheared ..... 1.80c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh $40.00
F.o.b. Cleveland 40.00
F.o.b. Chicago 41.00
F.o.b. Anderson, Ind. 41.00
F.o.b. Youngstown 41.00
F.o.b. Worcester, Mass. 42.00
F.o.b. Birmingham 43.00
F.o.b. San Francisco 49.00
F.o.b. Galveston 46.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$20.50	$21.00	$20.00	$21.50
Bethlehem, Pa.	20.50	21.00	20.00	21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Swedeland, Pa.	20.50	21.00	20.00	21.50
Steelton, Pa.	....	....	20.00	....
Sparrows Point, Md.	20.50	....	20.00	....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Youngstown	19.50	19.50	19.00	20.00
Buffalo	19.50	20.00	18.50	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Cleveland	19.50	19.50	19.00	20.00
Toledo, Ohio	19.50	19.50	19.00	20.00
Jackson, Ohio	21.25	21.25	20.75	....
Detroit	19.50	19.50	19.00	20.00
Hamilton, Ohio	19.50	19.50	19.00	20.00
Chicago	19.50	19.50	19.00	20.00
Granite City, Ill.	19.50	19.50	19.00	....
Duluth, Minn.	20.00	20.00	....	20.50
Birmingham	15.50	15.50	14.50	20.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$21.00	$21.50	$20.50	$22.00
Brooklyn From East. Pa.	22.9289	23.4289	22.4289	23.9289
Newark or Jersey City, N. J. From East. Pa.	21.9873	22.4873	21.4873	22.9873
Philadelphia From Eastern Pa.	21.3132	21.8132	20.8132	22.3132
Cincinnati From Hamilton, Ohio	20.5807	20.5807	20.0807	21.0807
Canton, Ohio From Cleveland and Youngstown	20.8402	20.8402	20.3402	21.3402
Columbus, Ohio From Hamilton, Ohio	21.64	21.64	....	....
Mansfield, Ohio From Cleveland and Toledo	21.3832	21.3832	20.8832	21.8832
Indianapolis From Hamilton, Ohio	21.9289	21.9289	....	....
South Bend, Ind. From Chicago	21.6935	21.6935	....	....
Milwaukee From Chicago	20.57	20.57	....	....
St. Paul From Duluth	21.94	....	....	....
Davenport, Iowa From Chicago	21.3832	21.3832	....	....
Kansas City From Granite City	22.2178	22.2178	....	....
San Francisco, Los Angeles or Seattle. From Provo	22.315	....	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$24.00

GRAY FORGE PIG IRON

Valley furnace $19.00
Pittsburgh district furnace 19.00

CHARCOAL PIG IRON

Lake Superior furnace $22.00

Delivered Chicago 25.2528

Delivered Buffalo 25.595

CANADA

Pig Iron

Per gross ton:

Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.75..... 20.50
Malleable 22.50

Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25..... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $75.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $26.00
50-ton lots 3-mo. shipment 24.00
F.o.b. New Orleans 26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6.00 to 6.50%	$22.75	12%	..$29.25
6.51 to 7.00%	23.25	13%	.. 30.75
7.00 to 7.50%	23.75	14%	.. 32.25
7.51 to 8.00%	24.25	15%	.. 33.75
8.00 to 8.50%	24.75	16%	.. 35.25
8.51 to 9.00%	25.25	17%	.. 36.75
9.00 to 9.50%	25.75		
9.51 to 10.00%	26.25		
10.00 to 10.50%	26.75		
10.51 to 11.00%	27.25		
11.00 to 11.50%	27.75		
11.51 to 12.00%	28.25		

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10.00 to 10.50%	$27.75	13%	..$31.75
10.51 to 11.00%	28.25	14%	.. 33.25
11.00 to 11.50%	28.75	15%	.. 34.75
11.51 to 12.00%	29.25	16%	.. 36.25
12%	30.25	17%	.. 37.75

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained T. del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.....	$1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb contained Cr. delivered, in car loads	10 0[illegible]
Ferrochromium, 2% carbon .....16.50c. to 17.00c	
Ferrochromium, 1% carbon .....17.50c. to 18.00c	
Ferrochromium, 0.10% carbon .....19.50c. to 20.00	
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c	
Ferrovanadium, del. per lb. contained V. .....$2.70 to $2.90	
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C. f.o.b. furnace carload and contract per net ton .$137.50	
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18% with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton.....	45.50
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices .....$5 a ton higher	

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$14.25 to $14.75
No. 2 heavy melting steel	13.00 to 13.50
No. 2 railroad wrought	14.25 to 14.75
Scrap rails	14.50 to 15.00
Rails, 3 ft. and under	15.50 to 16.00
Compressed sheet steel	14.25 to 14.75
Hand bundled sheet steel	13.00 to 13.50
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	9.75 to 10.25
Short shov. turnings	9.75 to 10.25
Short mixed borings and turnings	8.50 to 9.50
Cast iron borings	8.50 to 9.50
Cast iron carwheels	14.00 to 14.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	14.00 to 14.50
Railr. knuckles and couplers	16.25 to 16.75
Rail. coil and leaf springs	16.25 to 16.75
Rolled steel wheels	16.25 to 16.75
Low. phos. billet crops	16.75 to 17.25
Low phos. sheet bar crops	16.50 to 17.00
Low phos. punchings	16.00 to 16.50
Low phos. plate scrap	15.25 to 15.75
Steel car axles	15.00 to 15.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$13.00 to $13.50
Automobile hvy. melt steel	11.50 to 12.00
Shoveling steel	13.00 to 13.50
Hydraulic comp. sheets	12.25 to 12.75
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.00 to 12.50
Rolled carwheels	14.00 to 14.50
Railroad tires	14.00 to 14.50
Railroad leaf springs	14.00 to 14.50
Axle turnings	12.50 to 13.00
Steel couplers and knuckles	14.00 to 14.50
Coil springs	15.00 to 15.50
Axle turnings (elec. fur.)	13.25 to 13.75
Low phos. punchings	14.75 to 15.25
Low phos. plates, 12 in. and under	14.75 to 15.25
Cast iron borings	6.00 to 6.50
Short shoveling turnings	7.00 to 7.50
Machine shop turnings	6.50 to 7.00
Rerolling rails	14.00 to 14.50
Steel rails, less than 3 ft.	14.50 to 15.00
Steel rails, less than 2 ft.	15.50 to 16.00
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.25 to 13.75
Railroad malleable	16.00 to 16.50
Agricultural malleable	14.50 to 15.00

	Per Net Ton
Iron car axles	$16.00 to $16.50
Steel car axles	14.00 to 14.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.75 to 12.25
No. 2 busheling, old	6.50 to 7.00
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	7.00 to 7.50
No. 1 machinery cast	12.00 to 12.50
Clean automobile cast	11.00 to 11.50
No. 1 railroad cast	10.75 to 11.25
No. 1 agricultural cast	10.25 to 10.75
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.00 to 9.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.50
No. 2 heavy melting steel	$11.00 to 11.50
Hydraulic compressed, new	11.50 to 12.00
Hydraulic compressed, old	8.50 to 9.00
Steel rails for rolling	14.00 to 14.50
Cast iron carwheels	13.00 to 13.50
Heavy breakable cast	12.00
No. 1 cast	13.00 to 13.50
Stove plate (steel works)	9.50 to 10.00
Railroad malleable	15.00 to 15.50
Machine shop turnings	7.50 to 8.00
No. 1 blast furnace	6.25
Cast borings	6.00
Heavy axle turnings	9.50 to 10.00
No. 1 low phos. heavy	15.00 to 16.00
Couplers and knuckles	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Steel axles	16.00 to 16.50
Shafting	18.00 to 18.50
No. 1 railroad wrought	12.00 to 12.50
Spec. iron and steel pipe	9.75 to 10.25
Bundled sheets	10.50 to 11.00
No. 1 forge fire	10.50 to 11.00
Cast borings (chem.)	10.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$11.00 to $11.50
No. 2 heavy melting steel	9.00 to 9.50
Scrap rails for melting	10.50 to 11.00
Loose sheet clippings	7.00 to 7.50
Bundled sheets	8.00 to 8.50
Cast iron borings	6.00 to 6.50
Machine shop turnings	6.75 to 7.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	4.25 to 4.75
Rails for rolling	11.00 to 11.50
No. 1 locomotive tires	9.50 to 10.00
Short rails	14.00 to 14.50
Cast iron carwheels	10.50 to 11.00
No. 1 machinery cast	11.50 to 12.00
No. 1 railroad cast	10.75 to 11.25
Burnt cast	7.75 to 8.25
Stove plate	7.75 to 8.25
Agricultural malleable	9.75 to 10.25
Railroad malleable	11.50 to 12.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.25
No. 2 heavy melting steel	$12.00 to 12.25
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	9.25 to 9.75
Drop forge flashings	11.75 to 12.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	8.50 to 9.00
No. 1 busheling	11.50 to 12.00
Steel axle turnings	10.75 to 11.25
Low phos. billet crops	16.00 to 16.50
Cast iron borings	8.25 to 8.75
Mixed borings and short turnings	8.25 to 8.75
No. 2 busheling	8.25 to 8.75
No. 1 cast	13.50 to 14.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.50 to 8.00
Rails under 3 ft.	15.50 to 16.00
Rails for rolling	15.50 to 16.00
Railroad malleable	16.50 to 17.00
Cast iron carwheels	12.75 to 13.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting scrap	11.00 to 11.50
Scrap rails	12.00 to 12.50
New hydraul. comp. sheets	11.00 to 11.50
Old hydraul. comp. sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.00 to 11.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	6.50 to 7.00
Knuckles and couplers	13.00 to 14.00
Coil and leaf springs	13.00 to 14.00
Rolled steel wheels	13.00 to 14.00
Low phos. billet crops	14.50 to 15.00
Short shov. steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 busheling	7.00 to 7.50
Steel car axles	12.50 to 13.00
Iron axles	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 cupola cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Steel rails, 3 ft. and under	14.50 to 15.00
Cast iron carwheels	12.00 to 12.50
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$10.00
No. 1 heavy melting steel	$7.40 to 7.90
*Scrap rails	9.75 to 10.00
*No. 2 steel	9.00
No. 2 steel	6.40 to 6.90
Breakable cast	6.75 to 7.00
Machine shop turnings	3.65 to 3.90
*Machine shop turnings	5.25 to 5.50
Bundled skeleton, long	6.75 to 6.90
Forge flashings	6.00 to 6.25
Shafting	13.00 to 13.25
Steel car axles	12.50 to 13.00
Cast iron borings, chemical	5.00 to 7.00
*No. 1 textile cast	9.10 to 9.25
*Stove plate	6.75 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	9.75 to 10.00
No. 1 machinery cast	9.25 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.50 to *$9.00†
No. 2 heavy melting steel	7.50 to *8.00†
Heavy breakable cast	7.00 to 7.50
No. 1 machinery cast	8.00 to 8.50
No. 2 cast	7.50† to 7.75*
Stove plate	6.75† to 7.00*
Steel car axles	13.50 to 14.00
Shafting	13.50 to 13.75
No. 1 railroad wrought	8.50 to 9.00
No. 1 yard wrought long	7.50 to 8.00
Spec. iron and steel pipe	6.00 to 6.50
Forge fire	6.50 to 7.00
Rails for rolling	9.00 to 10.00
Short shoveling turnings	3.50 to 4.00
Machine shop turnings	4.00 to 4.50
Cast borings	3.00 to 3.50
No. 1 blast furnace	3.00 to 3.50
Cast borings (chemical)	10.00 to 11.00
Unprepared yard iron and steel	4.50 to 5.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$11.00
No. 1 hvy. cast (cupola size)	9.50
No. 2 cast	8.00

† Loading on barge.
*50c. higher offered at nearby New Jersey points.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.00
Stove plates	7.00
Steel axles	11.50 to 12.00
Iron axles	11.50
No. 1 railroad wrought	8.50
Rails for rolling	12.50
No. 1 cast	10.50 to 11.00
Tramcar wheels	10.00 to 10.50

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:

Selected heavy steel	$11.00 to $11.50
No. 1 heavy melting	10.75 to 11.25
No. 2 heavy melting	9.00 to 9.50
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	11.50 to 12.00
Railroad springs	12.00 to 12.50
Bundled sheets	7.50 to 8.00
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	6.50 to 7.00
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	12.50 to 13.00
Machine shop turnings	2.75 to 3.25
Heavy turnings	8.00 to 8.50
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	9.00 to 9.50
Steel rails less than 3 ft.	13.00 to 13.50
Steel angle bars	12.50 to 13.00
Cast iron carwheels	10.00 to 10.50
No. 1 machinery cast	11.25 to 11.50
Railroad malleable	13.25 to 13.75
No. 1 railroad cast	10.25 to 10.75
Stove plate	7.50 to 8.00
Agricult. malleable	11.75 to 12.25

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$9.75 to $10.25
Borings and short turnings	$5.50 to $6.00
Long turnings	5.50 to 6.00
No. 1 machinery cast	13.00 to 13.50
Automotive cast	13.00 to 13.50
Hydraulic comp. sheets	10.25 to 10.75
Stove plate	7.75 to 8.25
New factory busheling	9.50 to 10.00
Old No. 2 busheling	5.25 to 5.75
Sheet clippings	7.25 to 7.75
Flashings	9.00 to 9.50
Low phos. plate scrap	10.50 to 11.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$8.00	$7.50
Rails, scrap	8.50	8.00
Machine shop turnings	3.50	3.50
Boiler plate	5.00	5.00
Heavy axle turnings	4.50	4.00
Cast borings	4.50	4.00
Steel borings	3.00	3.00
Wrought pipe	4.00	4.00
Steel axles	8.00	8.50
Axles, wrought iron	8.00	8.50
No. 1 machinery cast	9.50	9.00
Stove plae	6.50	6.00
Standard carwheels	7.75	7.00
Malleable	7.50	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer 51.50% iron	4.65
Messabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria	10.25c.
Iron, low phos., Swedish, average 68½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	25c.
Manganese, African, Indian, 49-51%	26c.
Manganese, Brazilian, 46 to 48½%	24c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered	$15.75 to $16.00
Tungsten, domestic, scheelite delivered	15.75 to 16.00

	Per Gross Ton
Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to $17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic Seaboard	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all rail shipment	$16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	20.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.65 to $3.80
Foundry, f.o.b. Connellsville Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens, for delivery outside switching district	9.00
Foundry, by-product, delivery in Chicago switching district	9.75
Foundry, by-product, New England, delivered	11.50
Foundry, by-product, Newark or Jersey City, del'd	9.24 to 9.72
Foundry, by-product, Phila.	9.03
Foundry, by-product, Clevelanda, delivered	9.75
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis f.o.b. ovens	$8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.90 to 2.10
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.15
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.40

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	5.00c.
No. 5 industrial fuel oil	3.77c.

	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	50.00	45.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	9.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa.	$45.00
Domestic, f.o.b. Baltimore and Chester	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.35c.
Squares and flats	3.35c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 l.b	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lbs.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

Per Cent Off List

Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap. or	
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87½
Cut point set screws	75 and 10
Flat head bright wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled: strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	special
Long terne sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x ½ in. and larger	3.75c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
‡Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.76c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled aneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.50c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	‡3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	$2.75
*No. 9 galv. wire, per 100 lb.	3.10
*Com. wire nails, base per keg	2.70

†Outside delivery 10c. less.

*For 5000 lb. or less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.42c.
Bars, rounds, flats and angles	3.22c.
Other shapes	3.37c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.72c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1in. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

Base per Lb.

Plates	3.38c.
Struc. shapes	3.25c.
Soft steel bars	3.05c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.55c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb. (2500-lb. lots or under)	3.55
(Over 2500 lb.)	3.45

BOSTON

Base per Lb.

Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates—Sheered, tank and univ. mill, ¼ in. thick and heavier	3.56c.
Floor plates, diamond pattern	5.36c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.09c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)	4.72c.
Bands	3.39c.
Hoops	3.39c.
†Cold-finished bars	3.64c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts	70 and 10 per cent off list

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.

†With reduction in chemical extras.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.11c.
Soft steel bars, squares and hexagons	3.26c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 20)	4.66c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	3.86c.
Boiler rivets, cone head (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.15c.
Com. wire nails	2.85c.
Cement coated nails	2.85c.

Per Cent Off List

Machine bolts	70 and 10
Carriage bolts	70 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70 and 10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	3.25c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	4.02c.
Bands and hoops	3.55c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24	4.50c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

*Mild steel bars	3.00c.
**Reinforcing bars	2.85c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10	3.10c.
‡Hot-rolled annealed sheets, No. 24	3.60c.
‡Galvanized sheets, No. 24	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.58c.
§Cold-rolled squares, hex. and flats	3.58c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply. †Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over base; 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb., add 30c 0 to 999 lb., add 50c.

225 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add $1.00; for 0 to 299 lb. add $1.75; for combined order under 100 lb. add $3.00.

** For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.36c.
Iron bars	3.36c.
Reinforcing bars	3.36c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10	3.36c.
Hot-rolled annealed sheets, No. 24	4.16c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	3.98c.

MEMPHIS

Base per Lb.

Mild steel bars	3.47c.
Shapes, bar size	3.47c.
Iron bars	3.47c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10	3.47c.
Hot-rolled annealed sheets, No. 24	4.27c.
Galvanized sheets, No. 24	4.80c.
Steel bands	3.72c.
Cold-drawn rounds	3.89c.
Cold-drawn flats, squares, hexagons	5.89c
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

Base per Lb

Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.50c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.30c.
Structural rivets	4.25c.
Boiler rivets	4.25c
Common wire nails, base per keg	$2.95
Bolts and nuts, per cent off list	70

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.50c.	3.60c.	3.55c.
Shapes, standard	3.50c.	3.60c.	3.55c.
Soft steel bars	3.50c.	3.60c.	3.70c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.60c.	3.70c.	3.75c.
Galv. sheets (No. 24)	5.00c.	4.95c.	5.00c.
Cold finished steel Rounds	5.80c.	5.85c.	6.00c
Squares and hexagons	7.05c.	7.10c.	7.25c.
Flats	7.55c.	7.60c.	8.25c.
Common wire nails —base per keg less carload	$3.20	$3.20	$3.20

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

Base per Lb

High speed	57c
High carbon chrome	37c
Oil hardening	22c
Extra	17c
Regular	14c

Cleveland Rate Unchanged at 61 Per Cent

Finishing Mill Schedules Maintained But Mill Backlogs Are Being Cut Down — New Quantity Extras on Alloy Steel Bars

CLEVELAND, Jan. 14.—New demand for finished steel shows an upward trend, but it has not yet recovered the pre-holiday volume. This is particularly true of business from the automotive industry, including parts makers, although there is some gain in orders from that source. The expected large orders for sheets from the automotive industry have not yet materialized, but mills are confident that considerable tonnage will be placed before the end of the month.

Ingot output in the Cleveland-Lorain district is unchanged this week at 61 per cent of capacity. However, there was considerable change in operations. Two additional open-hearth furnaces were started up in Lorain and one in Cleveland, but this gain was offset by the shutting down of three Republic furnaces in Cleveland due largely to a reduced demand for sheet bars.

Recent finishing mill schedules are being maintained, but backlogs are being cut down. Strip steel is moving in good volume, being more active at present than sheets. Some cold-rolled strip mills have increased their schedules. Finished steel is in good demand from manufacturers of agricultural implements, road machinery builders and makers of dump bodies for trucks. Motor truck builders expect a gain in sales this year over last. The receiver of the Willys-Overland Co., Toledo, has asked court authority to build 15,000 automobiles.

The $3 a ton concession on cold-rolled and hot-rolled annealed sheets prevailing in the Detroit territory for some time is being granted in some cases to stamping plants in this district, but only for steel for making automobile parts. Mills have a heavy backlog of orders for billets and wire rods, and some do not expect to be able to ship all their wire rod orders until February. This means considerable delay in testing the price advance named for the current quarter.

Pig Iron

New demand for small lots shows moderate improvement, as some consumers who did not cover very far ahead late last year at the old prices are getting to the bottom of their stock piles and are placing new orders. This new business is in small lots, few of the orders being for over 200 tons. Automobile foundries are using a great deal of iron and their present melt is expected to be maintained until at least Feb. 15. Iron is being shipped this month at about 60 per cent of the December rate, which is fully as good as had been expected.

Sheets

New large-lot orders that are expected from the motor car industry have not yet appeared and business from that source fell off the past week. These substantial orders from the automobile companies are looked for next week. Business in this territory from manufacturers of household equipment and from miscellaneous sources, which experienced a lull during the holidays, shows some improvement. Concessions of $3 a ton on cold-rolled and hot-rolled annealed sheets are being made in some cases to stamping plants in this territory for making automobile parts, thus giving the buyers the same concession that is being made in Detroit to large consumers in the automotive field.

Strip Steel

Additional orders for substantial tonnages have been placed by some of the large parts makers who placed considerable business during the previous week. This additional business is for sizes not covered in the previous orders. New business is coming in fair volume from local stamping plants doing automotive work. There is considerable pressure for deliveries. Demand from non-integrated cold-rolling plants for hot-rolled strip is quite heavy.

Bars, Plates and Shapes

Demand for bars is fair, although not as good as before the holidays. Forging companies have not secured as large releases from automobile manufacturers as they expected this month. However, alloy steel bars are moving very well. Activity in the structural field continues rather light and fabricators'

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.20 CARBON-MN-MO ALLOY STEEL

A free machining carburizing steel of controlled grain size suitable for gears, worms, clutches, chuck jaws, cams, forming rolls, spindles, etc., which responds with excellent results to single or double treatment.

IN STOCK FOR IMMEDIATE DELIVERY

WHEELOCK, LOVEJOY & COMPANY, INC.

CAMBRIDGE CLEVELAND CHICAGO NEWARK DETROIT

prices are unsteady. Cleveland has placed 215 tons for a municipal garage, and bids have been asked for a State highway bridge requiring 180 tons. Some railroad bridge work is in prospect. Plates are quiet.

New quantity extras have been adopted for hot-rolled alloy steel, replacing the present lump sum extras and resulting in some cases in advantage to the buyer. The new extras are:

6,000 lb. and over....base
4,000 to 6,000 lb..... 5c. per 100 lb.
2,000 to 4,000 lb.....15c. per 100 lb.
1,000 to 2,000 lb.....60c. per 100 lb.

Iron Ore

Shipments from Lake Erie docks in December were 238,022 tons as compared with 93,387 tons during the same period last year. The dock balance Jan. 1 was 5,093,441 tons as against 5,155,331 tons the same date a year ago. Receipts at Lake Erie docks during the year were 19,907,228 tons as against 15,572,523 tons during the previous year. Shipments from these docks were 14,250,369 tons as against 11,192,155 tons during 1934.

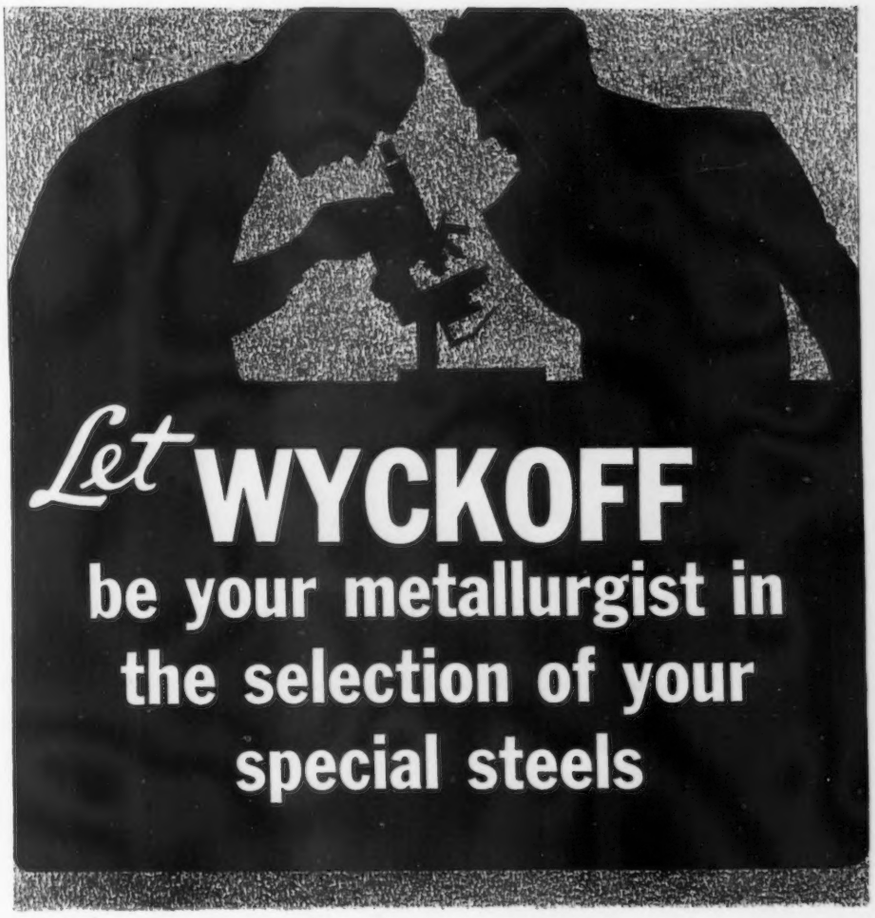
Scrap

The market is higher and very firm on steel-making grades. A Cleveland mill has bought a small tonnage of blast furnace scrap at $8.75 a ton, or 75c. higher than in its previous purchase. This purchase indicates a 25c. recession from the $1 a ton advance quoted by dealers a week ago. A Valley district mill bought a small tonnage of No. 1 heavy melting steel at $14.25 to $14.50. Brokers are paying $13.25 for this grade for delivery to a Cleveland mill, and in the Valley district brokers are paying $14 for No. 1 and $13.25 for No. 2 steel. The supply of scrap is still rather scarce and there is a disposition to hold material for better prices.

Inland to Build New Open-Hearths

INLAND STEEL CO., Chicago, has let contracts to Milwaukee fabricators for structures to house four new open-hearth furnaces and a new blooming mill which will be furnished by the Mesta Machine Co.

This will be Inland's third blooming mill and brings its total count of open-hearths to 31, if all old units are retained in service. Each of the new furnaces will be rated at 150 tons.



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General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of Cold Drawn Steels
Turned and Polished Shafting Turned and Ground Shafting

California Steel Group to Meet

THE twelfth annual convention of the Iron, Steel and Allied Industries of California will be held at the Hotel Del Monte, Del Monte, Cal., Feb. 6, 7 and 8. James A. Emery, general counsel, National Association of Manufacturers, will speak on "Industry and the Federal Government." Frederick J. Koster, president, California Barrel Co., will talk on "Industry's Responsibility for Economy in Governmental Expenditures."

Walter S. Tower, executive secretary, American Iron and Steel Institute, has been invited to make an address.

Open discussion on prefabricated houses will be held and group meetings are scheduled. At the banquet on the evening of Feb. 7 the United States Steel Corpn.'s picture, "The Story of Steel," will be shown.

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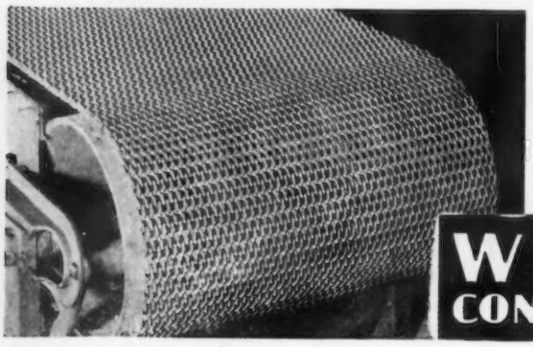

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WISSCO CONVEYOR BELTS

Election of Roemer to Presidency of Pittsburgh Steel Co. Points to Merger

PITTSBURGH, Jan. 14.—Henry A. Roemer, chairman and president of Sharon Steel Hoop Co., Sharon, Pa., has been elected president of the Pittsburgh Steel Co. to fill the vacancy caused by the retirement of Homer D. Williams. Mr. Roemer and J. H. Hillman, Jr., who is on the board of directors of the Sharon company, were elected directors of the Pittsburgh Steel Co. to fill the vacancies occurring through the resignation of Emil Winter and Dwight Winter. Mr. Roemer and Mr. Hillman also were made members of the executive committee in place of Mr. Williams and Emil Winter.

Considerable significance is attached to Mr. Roemer's appointment in view of recent developments. All indications now point to a merging of the Pittsburgh Steel Co. and the Sharon Steel Hoop Co. The latter company last week acquired a sizable minority interest in the Pittsburgh company through the purchase of a block of preferred and common stock arranged by Speyer & Co., New York bankers. Although no plans to merge the companies have been announced, it is believed that Mr. Roemer will serve concurrently as head of both companies until merging plans are launched.

Mr. Roemer's steel experience embraces the wire business, chief activity of the Pittsburgh Steel Co. Prior to his association with the Sharon company he was identified with American Sheet Steel Co., Youngstown Sheet & Tube Co. and Canton Sheet Steel Co. He was instrumental in organizing the Superior Sheet Steel Co., Canton, in 1919 and served as president of that company until 1927, when it was merged with the Chapman-Price Steel Co., Indianapolis, and the Kokomo Steel & Wire Co., Kokomo, Ind., to form the Continental Steel Corpn. He was president of the Continental company from 1927 to 1930, and on Jan. 1, 1931, assumed the presidency of the Sharon company, taking over also the chairmanship in September, 1933.

H. A. ROEMER

In uniting the interests of the two companies it is planned to ship to Sharon some of the Pittsburgh Steel Co.'s products, particularly pig iron, which would tend to increase operations of the Pittsburgh concern's blast furnaces at Monessen. Moreover, some of the interests closely affiliated with Sharon Steel Hoop Co. expect to aid in marketing some of Pittsburgh Steel Co.'s products in other consuming territories. The Sharon company plans to develop some additional steel products, including galvanized and corrugated sheets.

Foundry Equipment Makers to Meet

THE Foundry Equipment Manufacturers Association, Cleveland, will hold its annual meeting at the Cleveland Hotel, Cleveland, Feb. 8, 1936. Arthur L. Tuscany is executive secretary.

In addition to handling routine matters such as reports of officers, election of three directors to fill expired terms, there are to be considered such subjects as plans in connection with the forthcoming exhibit of foundry equipment to be held at Detroit in May, 1936, during the annual meeting of the American Foundrymen's Association; plans for a broadened activity of the association occasioned by a greatly increasing demand for foundry equipment, bringing with it increasing responsibilities on the part of the equipment manufacturers.

A Turkish iron and steel industry—a part of the Industrial Five-Year Plan—will soon come into being. Preparations for the creation of such an industry are already completed, and foreign metallurgical experts have been engaged. It is claimed that construction will commence in 1936, and that the installation of the machinery will be completed two years later. Iron and steel production in Turkey after 1938 is expected to reach some 100,000 tons annually.

Steel Demand at Pre-Holiday Level in Philadelphia Area

District Mills Continue to Operate at 39 Per Cent — Scrap Maintains Strong Tone

PHILADELPHIA, Jan. 14. — Buying of flat-rolled steel products is again at about the same level which prevailed during December. The outlook for shapes and plates is also encouraging. The Pennsylvania Railroad is starting to release orders for 50,000 tons required for its car building program, the Navy Department has awarded sizable tonnages to district mills, and local shipyards expect to issue additional specifications over the next two months. Thus the outlook for first quarter is considered satisfactory, although mill activity will probably not go beyond 40 per cent for any length of time.

Reinforcing steel prices are being cut in some instances, a few favored customers are receiving preferential treatment on cold-rolled sheets, bolts and nuts are as usual none too steady, and the resale prices on pipe show some variance. On other products however, the market may be considered reasonably firm at published price levels.

No significant change has been made in the open-hearth activity of district mills. Consequently the Eastern Pennsylvania rate is unchanged from last week at 39 per cent of capacity.

Pig Iron

Carryover from last year will take care of principal users through the remainder of this month and well into February. Consequently, no pig iron seller anticipates even a semblance of satisfactory demand until the end of January. There are, of course, some routine tonnages trickling in, but the aggregate is unimpressive and deliveries are unhurried. Foreign brands, both foundry and basic, continue to supply a good portion of this district's needs, and this infiltration will probably continue for some time inasmuch as practically all domestic furnaces are adhering to the higher first quarter price schedules.

Sheets and Strip

The market has thrown off its holiday lethargy, and day-to-day demand has recently been practically on a par with the average established in December. Autobody stamping plants fully expect their orders to continue at a peak level for at least six months and have purchased steel accordingly. Radio makers continue to be good outlets for sheets, and miscellaneous consumption is holding at a fairly satisfactory level. Talk of a price rise for late first quarter delivery has seemingly disappeared. But this agitation for higher quotations did serve to steady the existing market. Even though several users of light cold-rolled sheets are occasionally receiving a 3.11c. price

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A Better Gear . . . Production Cost Cut 20%
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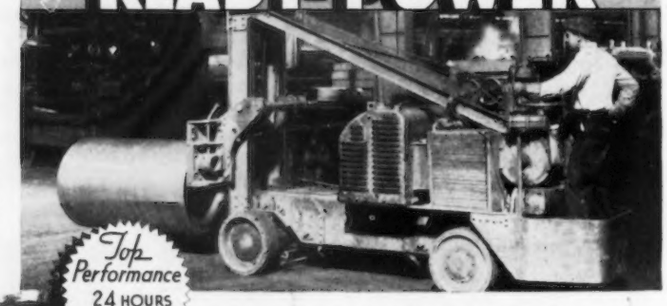

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Write for descriptive literature.

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in this area, most of this district tonnage is going at the quoted figure of 3.26c.

Bars, Plates and Shapes

It is estimated that the Pennsylvania Railroad has released between 5000 and 10,000 tons of the steel required for its car building program. At least 50,000 tons must yet be purchased, and sellers are hopeful that at least informal distribution for this quantity will be made with a fortnight. Sun Shipbuilding Co. must yet purchase the steel for four oil tankers, but this may not be done for a month or two. District mills fared well in the Navy Department schedules which were bid in Dec. 27. Central Iron & Steel Co. was awarded 2320 tons of plates as its bid did not call for certain extras which other makers quoted. On lot drawings an additional 600 tons of shapes and strip was allocated among several district mills and three local galvanizing plants. American Bridge Co. will furnish 2760 tons of shapes for an office building annex at Wilmington, Del., and Bethlehem Steel Co. will supply 1150 tons for a rayon plant at Richmond, Va. McCloskey & Co. have been awarded five Philadelphia school buildings, but until formal approval is received from Harrisburg the 1000 tons of shapes involved will not be awarded.

Imports

The following iron and steel imports were received here last week: 6100 tons of iron ore from Brazil; 3579 tons of pig iron and 483 tons of spiegeleisen from Soviet Russia; 3208 tons of pig iron from Netherlands; 101 tons of sponge iron, 74 tons of steel tubes, 25 tons of steel wire, 24 tons of steel forgings and 16 tons of steel bars from Sweden; 40 tons of ferromanganese from British India.

Scrap

Scrap is being shipped into practically all district mills. The inclement weather of several weeks ago seriously hampered shipments and several consumers were reduced to dangerously narrow inventories. No new buying has been reported, but it is probable that additional tonnages will be purchased within the next two weeks. If this occurs it is equally probable that local brokers will attempt to raise No. 1 to above the quoted $12.50 level. With the Pittsburgh market stronger, brokers here assume that the price here should rightfully be about $13, based on potential deliveries from New England to each district. At the Navy Yard opening last week, about 100 tons of unprepared scrap went to a local mill at $9.75 f.o.b., and several hundred tons of No. 1 was bid in by a local broker at about $11 f.o.b. Both of these prices indicate a strong market tone. The January Budd Mfg. Co. list of compressed bundles, aggregating 3000 tons, went to the Pencoyd mill at somewhat over $11 a ton. New foreign business has come into the market, and brokers are buying what they can along the Coast.

Fabricated Structural Steel

Awards in Good Volume—New Projects Decline

NORTH ATLANTIC STATES

Canterbury, Conn., 305 tons, State highway bridge, to Fort Pitt Bridge Works Co.

Abington, Mass., 150 tons, high school, to West End Iron Works.

Richmond Hill, N. Y., 2600 tons, Sheffield Farms milk distribution depot, to Bethlehem Steel Co.

Grove City, Pa., 190 tons, I. C. Ketler dormitory, to Pittsburgh Bridge & Iron Co.

Pottsville, Pa., 115 tons, post office, to Reading Steel Products Co.

Pottsville, Pa., 100 tons, post office, to Reading Steel Products Co.

Wilmington, Del., 2700 tons, office building for du Pont Co., to American Bridge Co.

Baltimore, 110 tons, General Aged People's Home, to Dietrich Brothers.

Westminster, Md., 145 tons, high school, to Maryland Steel Products Co.

SOUTH AND SOUTHWEST

Richmond, Va., 1150 tons, rayon plant for du Pont Co., to Bethlehem Steel Co.

Holden, W. Va., 600 tons, coal tipple, to Vierling Steel Works.

Huntington, W. Va., 270 tons, post office and court house extension, to Ingalls Iron Works Co.

Hamlet, N. C., 130 tons, State highway, to Southern Engineering Co.

Llano County, Tex., 785 tons, bridge, to Mosher Steel Co.

Taylor County, Tex., 130 tons, bridge, to Mosher Steel Co.

Dallas, Tex., 600 tons, centennial building, to Bethlehem Steel Co.

Birmingham, Ala., 510 tons, three State highway underpasses in county, to Virginia Bridge & Iron Co.

Lanett, Ala., 110 tons, machine shop for Lanett Cotton Mills, to Virginia Bridge & Iron Co.

Shawnee, Okla., 150 tons, municipal auditorium, to Capitol Steel & Iron Co.

CENTRAL STATES

Cleveland, 215 tons, city garage, to Fort Pitt Bridge Works.

Toledo, Ohio, 135 tons, Roosevelt and Old Orchard schools, to Bethlehem Steel Co.

Peru, Ind., 210 tons, State highway bridge, to Bethlehem Steel Co.

Austin, Ind., 210 tons, Morgan packing warehouse, to Central States Bridge Co.

Indiana Harbor, Ind., 4500 tons, mill buildings for Inland Steel Co., to unnamed Milwaukee fabricators.

Grandville, Mich., 315 tons, State highway bridge, to R. C. Mahon Co.

Detroit, 445 tons, extension to power house for Chevrolet Motor Co., to Whitehead & Kales, Inc.

Fulton County, Ill., 153 tons, bridge, to Joseph T. Ryerson & Son, Inc.

Mount Vernon, Ill., 150 tons, high school, to Mount Vernon Bridge Co.

Mason City, Iowa, 170 tons, bridge for Milwaukee Road, to Milwaukee Bridge Co.

Weldon Springs, Mo., 4200 tons, Mis-

souri River State highway bridge, to Stupp Brothers Bridge & Iron Co.

WESTERN STATES

Colorado Springs, Colo., 240 tons, State bridge over Monument Creek, to Minneapolis-Moline Power Implement Co.

Byers, Colo., 325 tons, State highway bridge, to Midwest Steel & Iron Co.

Skamonia County, Wash., 278 tons, State bridge over White Salmon River, to Pacific Car & Foundry Co.

Dudley, Wash., 129 tons, State bridge over Yakima River, to an unnamed bidder.

Santa Monica, Cal., 860 tons, hangar for Douglas Aircraft Co., to Bethlehem Steel Co.

Vernon, Cal., 100 tons, storage plant for Pennzoil Co., to an unnamed bidder.

Oakland, Cal., 110 tons, State undercrossing at Mountain Boulevard, to Bethlehem Steel Co.

Stockton, Cal., 425 tons, State undercrossing at Charter Way, to Judson-Pacific Co.

Stanislaus County, Cal., 171 tons, State bridge, to Moore Dry Dock Co.

San Francisco, 235 tons, State undercrossing at Army Street, to Judson-Pacific Co.

Los Angleles, 500 tons, Specification 137 for Colorado River aqueduct, to Western Pipe & Steel Co.

Los Angeles, 170 tons, tunnel ribs for Metropolitan Water District of Southern California, to Consolidated Steel Corpn.

Seattle, 190 tons, Queen Anne Drive bridge, to Wallace Bridge & Structural Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 1700 tons, express highway, West Seventy-ninth to West Eighty-second Street.

Brooklyn, 1000 tons, public school No. 234.

State of New York, 675 tons, New York Central grade crossing eliminations in Newark and Rotterdam; bids Jan. 21.

North Tonawanda, N. Y., 150 tons, school.

Montgomery County, Pa., 300 tons, highway bridge; bids Jan. 17.

Easton, Pa., unstated tonnage, post office; bids Jan. 27.

Plymouth Township, Pa., 300 tons, State highway bridge.

Baltimore, 450 tons, Eastern high school.

Washington, 1800 tons, Federal Reserve building; bids on general contract Jan. 29 by Federal Reserve board of governors.

Washington, 300 tons, Murphy's store No. 190.

SOUTH AND SOUTHWEST

Maricopa County, Ariz., 101 tons, State undergrade crossing near Phoenix; bids Jan. 24.

El Dorado, Ark., 100 tons, highway bridge.

Sequoia County, Okla., 140 tons, highway bridge.

Caddo County, Okla., 116 tons, highway bridge; J. J. Thompson, Oklahoma City, low bidder on general contract.

Custer County, Okla., 115 tons, highway bridge; T. C. Ottinger, Tulsa, Okla., low bidder on general contract.

CENTRAL STATES

State of Ohio, 180 tons, bridge in Logan County; bids Jan. 28.

Wayland, Mo., 360 tons, highway bridge over Des Moines River; F. W. Whitehead, Kahoka, Mo., low bidder on general contract.

Cheyenne Co., Kan., 450 tons, highway bridge at St. Francis; Omaha Steel Works, low bidder.

WESTERN STATES

Grand Junction, Colo., 500 tons, State highway underpass; bids opened.

Adams County, Colo., 137 tons, State undercrossing north of Denver; bids opened.

State of Idaho, 750 tons, highway bridges at Thornton and Dufort.

Pleasant Grove, Utah, 110 tons, two State undercrossings; bids Jan. 17.

State of Oregon, 575 tons, bridges.

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As modern engine speeds are stepped up to maximum rates, and heavier loads are imposed on gear mechanisms, only the use of *cold drawn steel* can insure the strength and stamina demanded for safety.
Gears cut from B & L Cold Drawn Steel eliminate the service hazards that come from hidden flaws in forgings or castings. There is less distortion from heat treatment after forming, and more freedom from internal stresses. If your problem is one of manufacturing economy, accuracy of finished part, or impact and wear resistance, then B & L engineers can help you determine the proper gear steel for your purpose.
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FABRICATED PLATES

AWARDS

North Reading, Mass., 135 tons, standpipe, to Graver Tank & Mfg. Co.

Texas City, Tex., 6000 tons, tanks for Pan-American Petroleum & Transport Co. instead of Texas Co., as reported last week, to Chicago Bridge & Iron Works.

Los Angeles, 31,500 tons, Specification 137, 16.47 mile unit of Colorado River aqueduct, to Western Pipe & Steel Co.

NEW PROJECTS

Sheridan, Wyo., 2000 tons, municipal pipe line.

Arcadia, Cal., 490 tons, 30-in. welded pipe; bids Jan. 21.

Heavy Work Is Feature of New York Market

Railroad and Construction Projects Are Bright Spots in Otherwise Dull Situation — General Bookings Depressed

NEW YORK, Jan. 14.—Mill bookings in this district are still depressed, suggesting that inventory taking has not been completed among all consumers. Some sellers report a fair pick-up in sheet sales, but otherwise demand is light except as it is affected by individual structural projects or railroad equipment programs. Tin plate specifications are lean, but ordinarily do not develop in volume until later in the year.

The New York Central will take bids Jan. 21 on 2500 to 3000 tons of bars and shapes for a covering for its tracks between Seventy-ninth and Eighty-second Streets in connection with the West Side elevated highway, Manhattan. For municipal work in this city the Procurement Division of the United States Treasury Department took bids on 500 tons of reinforcing bars yesterday and on about 800 tons last week.

The steel requirements of the 3000 open-top cars to be bought by the Bessemer & Lake Erie and Union railroads are now estimated at 45,000 tons. In addition 12,000 axles and 24,000 wheels will be required. The Pennsylvania Railroad is commencing to distribute steel among the mills for its 10,000-cars program. The Lehigh Valley plans to build 250 coal cars and to rebuild 750. The New York Central's inquiry for 35,000 tons of rails, momentarily expected, has not yet been issued.

Talk of higher prices on sheets is a source of particular concern to makers of steel drums, whose prices are unsettled.

Pig Iron

The moderate pick up in demand noticed two weeks ago has continued, and sales in this district last week totaled 2675 tons, or 100 tons less than was marketed in the preceding period. Foundry business is spotty. Some establishments appear to be busily engaged, while others have not shown any appreciable change since the December slump first made itself felt. On the whole, perhaps, a slight improvement in operations can be citied. As was the case two weeks ago, producer contracts remain unevenly distributed.

Reinforcing Steel

A number of attractive tonnages were placed in this district last week, the principal lot involving 1300 tons of bars for the New Jersey approach to the Midtown tunnel at Thirty-eighth Street. George M. Brewster, general contractor, placed the steel requirements with Truscon Steel Co. Bethlehem Steel Co. took 1100 tons in connection with the Ward's Island sewer. The State procurement division of the Treasury awarded 786 tons to W. Ames & Co. for a job in the metropolitan district. Bids have been submitted on approximately 2000 tons of mesh for New Jersey highway projects, but to date this business has not been concluded. The newly authorized East River tunnel, connecting Manhattan and Queens, will undoubtedly interest the trade, although no estimates have yet been made of bar tonnage needs.

Scrap

Barge loadings for export are going forward at a steady pace, although the total volume of material being handled is considerably under the average of last year. Three boats are currently loading, two for Japan and one for Italy. Most of these loadings are on old orders as very little new tonnage has come into the market during the past two months. Although foreign mills need and want scrap they still do not need it badly enough to pay what brokers ask. The brokers, on the other hand, are unwilling to shade their offers to any extent inasmuch as impending winter weather may tie up their operations or a strong Pittsburgh market may bolster the local situation to an unexpected degree.

German firms will participate in an iron and steel order totaling 790 tons, in connection with the construction of the Ata-Turk bridge over the Golden Horn. Various British and French firms also will supply steel for this bridge.

Forty-seven years' experience in providing a large list of satisfied customers with

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Heavy Export Scrap Demand at Boston

BOSTON, Jan. 14. — The situation in the scrap market continues very strong in reflection of the continued heavy buying of materials for export. Everything available is being taken and the price in all cases remains strong, with a possibility the range will show a moderate increase at any time. The fact that export has been so brisk right along has been a great factor for local yards, which have been kept busy.

Within the past few days there have been intimations that scrap may be placed upon the list of embargoed materials for Europe, but this has not had any direct foundation from authoritative sources. At all events, should such a step be taken, it will come at a time when conditions are decidedly improved, in that mills are now taking more material and the closing down of export would not be felt so keenly as would have been the case a year previously.

Following the turn of the year there has been a slight betterment developing in the warehouse business.

New England foundries, which underwent a very poor year in 1935, are beginning to get a little business and somewhat of a better atmosphere exists in this line.

Structural lines continue to go along with an assortment of small orders and with little prospect of any major tonnages showing for the immediate future.

Southern Places Rails With Ensley Mill

BIRMINGHAM, Jan. 14. — The Southern Railway System has purchased 3000 tons of 100-lb. rails and 1200 tons of tie plates and other accessories from the Tennessee Coal, Iron & Railroad Co. The material will be used on the Alabama Great Southern division. Back in the last quarter the Southern Railway also placed an order for 10,000 tons of rails. Rail backlogs are gradually accumulating. About two weeks ago the St. Louis-San Francisco bought 17,600 tons of rails, and other orders are also on hand. The Ensley rail mill, which closed down Jan. 1, is expected to resume production about Feb. 1.

New steel tonnage is fair in all lines. Sheets and wire products are holding steady, and lately there has been a slight pickup in plates and structural shapes. The abolition of the AAA is expected temporarily to affect demand from the farm markets.

Current sales of pig iron are light, as is to be expected. However, local furnaces have a large tonnage on their books from last quarter, and shipments continue good.

There is no change in the number of blast furnaces, with 12 active. During the present week Tennessee Coal, Iron & Railroad Co. will change Ensley No. 6 from foundry to recarburizing iron.

Open-hearth operations ranged from nine to 10 last week. The Tennessee company operated five for a part of the week and six for the remainder. Gulf States Steel Co. had four working all week. Schedules this week will be the same.

Tennessee Coal, Iron & Railroad Co. is installing a rotary shear in its Fairfield plate mill.

With final approval given to Birmingham's $6,000,000 industrial water system, plans are now being considered for starting the work as soon as possible. The project is being financed jointly by the PWA and WPA. This project will require a heavy tonnage of iron and steel products.

Corrosion takes no holiday!

WHILE you were home on Christmas and New Year's day, playing with the children's toys, Acid Corrosion dug in a little deeper—it always works harder when you're away, and does most damage then.

But if you had Duriron Equipment in charge of your corrosive solutions, all you had to worry about was how to fix the main-spring of Junior's wind-up train.

For Acid Corrosion goes into a tail-spin when it runs against Duriron. It's gotta take a holiday —it can't make headway.

Here's something new in Duriron (and also Durichlor), that might interest you—this new Y Valve:

Full opening—can't stick.
Body, bonnet, yoke and stem in positive alignment at all times.
Stem guided at three points, insuring perfect seating of the disc.
An acid valve that is mechanically right.

Bulletin 161 free for the asking.

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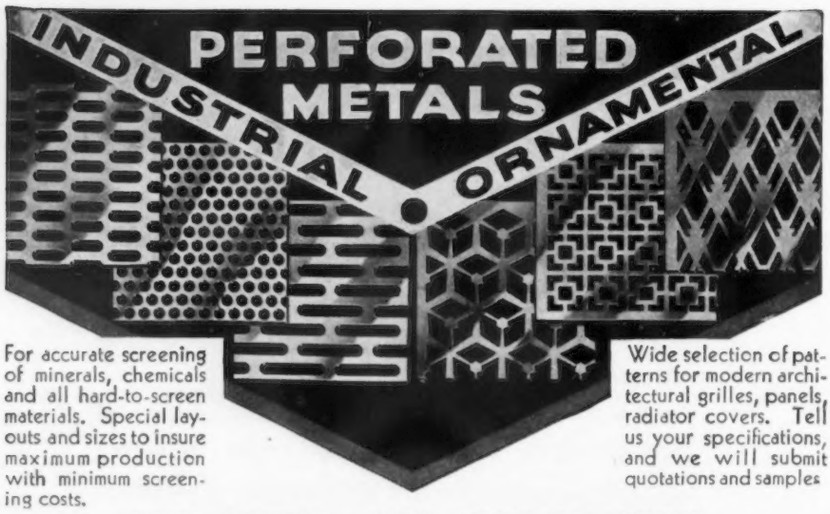
438 N. Findlay St. Dayton, Ohio



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Scrap Higher on Mill Buying at Cincinnati

CINCINNATI, Jan. 14.—With orders from mills totaling about 20,000 tons, one of the best weeks in recent months, district scrap dealers moved into a stronger position to take advantage of a long anticipated market improvement. Bids on all leading grades were moved upward from 25c. to 75c. a ton. Yard supplies are being increased and held against anticipated buying as steel operations get into stride.

A slight let-up in sheet steel fabrication was reflected, the past week, in a sharp decline in mill bookings. Ordering was at the rate of about 65 per cent of mill capacity, with the most noticeable reaction among automotive buyers. Rolling schedules are being maintained at 100 per cent and backlogs have been virtually wiped out. Optimism among sheet producers, however, continues strong.

Since a substantial number of district melters carried over reasonably heavy inventories, current pig iron business is disappointing. Bookings, the past week, dipped to about 1200 tons, all of which was in small lots. A slow improvement in the melt, however, to about 60 per cent of capacity, is an encouraging development. Automotive foundries are noticeably active, while business of machine tool melters is steadily improving.

Movement of foundry grades of coke has eased a trifle, but the month's average is still comparable with December. Prices are unchanged, by-product foundry being quotable at $9.50, delivered in Cincinnati.

St. Louis District Stove Plants Idle

ST. LOUIS, Jan. 14.—Operations in the stove plants in Belleville and Quincy, Ill., have ceased, because of a strike in the former place and inventories and repairs in the latter. Shipments of pig iron for January have been slow, indicating that there is some carryover of material in yards of melters as a result of the heavy movement from makers during December.

Operations of the fabricating plants in the district have been stepped to about 30 per cent of capacity, with one plant operating at 75 per cent and another at 60 per cent of capacity. F. W. Whitehead, Kahoka, Mo., is low bidder on the general contract for the highway bridge over the Des Moines River at Wayland, Mo., requiring 260 tons of structural steel.

Fabricators are beginning to place orders with the mills for structural steel required for WPA and PWA contracts that closed on Dec. 15, although the process is slow because of technicalities. The movement of roofing from jobbers' stocks is on the increase. The sales volume of warehouses for 1935 is estimated at 10 per cent ahead of 1934, with specialties showing the greatest increase. December business was better than December, 1934, but below October and November of 1935.

There has been virtually no buying of scrap by consumers in the district since Jan. 1, the mills being well fortified in view of their present order files, and dealers expect no buying until February. Railroad lists: St. Louis-San Francisco, 3500 tons, and Missouri Pacific, 75 carloads.

Large Steel Awards On Coast

SAN FRANCISCO, Jan. 14.—The Southern Pacific has bought 40,769 tons of 112-lb. and 131-lb. rails and 10,000 tons of bolts, spikes and tie plates, dividing the orders among Columbia Steel Co., Bethlehem Steel Co., and Colorado Fuel & Iron Co.

At Los Angeles 47,581 tons of plates, shapes and reinforcing bars have been awarded for Colorado River aqueduct work, of which 38,661 tons is for one project, specification 137. For this job the Western Pipe & Steel Co. was awarded 31,500 tons of plates and 500 tons of concrete bars, while the American Concrete & Steel Pipe Co. was given 6661 tons of reinforcing bars. The latter company also has booked 8750 tons for aqueduct work, while the Consolidated Steel Corpn. has been awarded 170 tons of shapes for tunnel ribs.

Blue Diamond Corpn. took 1256 tons of bars for the United States Treasury Department at Los Angeles, while Bethlehem Steel Co. will furnish 860 tons of structural steel for a Douglas Aircraft Co. aircraft hangar at Santa Monica, Cal. Approximately 660 tons of shapes for State undercrossings at Stockton and San Francisco will be furnished by Judson-Pacific Co.

New projects reported during the week were limited and mostly for minor tonnages. Bids have just been opened at Seattle for 500 gross tons of rails. The Treasury Department is in the market at San Diego for 760 tons of reinforcing bars.

With the holidays past and the inventory period nearly completed, the trade promises to get back into a more of a normal swing of activity. With general contracts placed on a score or more of grade separation projects, steel bookings during the coming week promise to be numerous.

Zinc Stocks Equivalent to Two Months' Needs on Basis of Present Consumption

Week-End Sales of Tin Heavier, As Bonus Bill Initiates Rise in Sterling—
Copper and Lead Respond Slightly to Talk of Inflation

NEW YORK, Jan. 14. — The domestic copper trade remains largely inactive, although a slight buying increase was noted over the week-end when 2200 tons was sold, compared with only 4371 tons for all preceding days this month. Talk of inflation has been moderately stimulated by the recent AAA ruling, but no definite tendencies toward improved inquiry are yet noticeable. Producers report that fabricators are specifying against old contracts steadily. The absence of new interest from these, as well as from other sources, has given rise to some discussion of the market's being underbought, but reactive tendencies generated by the unsettled European market apparently are restraining the domestic trade. At present electrolytic in London is selling for 8.65c. to 8.70c. a lb., while the domestic quotation remains firm at 9.25c. a lb., Connecticut Valley.

Lead

The market for lead bettered appreciably toward the close of last week when consumers began inquiring more heavily for February positions. Prior to this development the feeling existed that the market might weaken. However, with the renewal of consumer interest these fears have subsided. Producers estimate that January is now approximately 80 per cent covered, and that the bulk of February still has to be bought. Shipments, although not so heavy as heretofore, are satisfactory. The opening of March books in two weeks should prove an incentive to further buying, as the opinion of the trade is that inflationary inclinations will prompt consumers to cover forward needs more freely.

Tin

Approval of the Bonus Bill last week caused a rise in Sterling, and on this basis importers of tin experienced a pick-up in demand for their product. Sales were fair but not heavy, with buyers exhibiting a preference for January and February positions. Some inquiry circulated with respect to subsequent months' needs as far forward as June, though the business realized in this direction was slight. Since a week ago prices have netted an .87½c. gain, the price today for spot Straits metal at New York being 47.75c. a lb. Domestic supplies of spot are still somewhat tight, as, although recent arrivals have been heavy, advance buying has tended to absorb the bulk of incoming stocks. This morning in London standard quotations were £213 2s 6d for spot and £203 10s for futures. In the East the price was £208 15s.

Zinc

Trading in this commodity continues quiet and quotably unchanged at the 4.85c. a lb. level. Although statistically the market is in a very strong position, the decline in the foreign price makes it impossible at this time for domestic producers to advance quotations here. Undoubtedly such a step would be taken if the necessary support were available. Sales last week came to 1035 tons for Prime Western grade. Forward sales at the week's end totaled 45,325 tons, a decline in this respect of 3210 tons. Shipments were 4145 tons. Shipments of all grades of zinc in December totaled 41,466 tons, compared with 48,172 tons in November and 32,003 tons a year ago. Production was 40,136 tons, and stocks accordingly declined 1330 tons to 83,936 tons at the month's end. Unfilled orders decreased 8317 tons during this period. At present rate of consumption existing stocks are equivalent to two months' requirements.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 8	Jan. 9	Jan. 10	Jan. 11	Jan. 13	Jan. 14
Electrolytic copper, Conn.*	9.25	9.25	9.25	9.25	9.25	9.25
Lake copper, N. Y.	9.37½	9.37½	9.37½	9.37½	9.37½	9.37½
Straits tin, Spot, New York	47.12½	47.12½	47.25	....	47.87½	47.75
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	4.85
Zinc, New York†	5.22½	5.22½	5.22½	5.22½	5.22½	5.22½
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.62½c. a lb., New York.
Quicksilver, $76.00 to $78.00 per flask.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	48.75c. to 49.75c.
Tin, bar	46.75c. to 47.75c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	16.50c.
*High brass sheets	14.62½c.
*Seamless brass tubes	16.87½c.
*Seamless copper tubes	17.00c.
*Brass rods	13.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets	8.25c.
Antimony, Asiatic	17.00c. to 18.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	52.00c.
Tin, bar	54.00c.
Copper, Lake	10.25c.
Copper, electrolytic	10.25c.
Copper, castings	10.00c.
Zinc, slabs	6.25c. to 6.50c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	17.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	56.00c.
Solder, ½ and ½	29.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

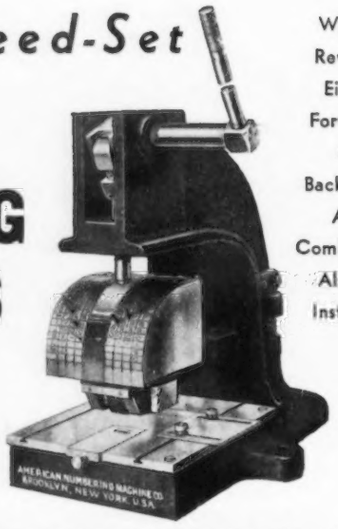
	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.12½c.	7.87½c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.00c.	6.50c.
Brass, heavy	4.00c.	4.62½c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.00c.	6.50c.
No. 1 yel. brass turnings	5.12½c.	5.62½c.
No. 1 red brass or compos. turnings	5.62½c.	6.12½c.
Lead, heavy	3.50c.	3.87½c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.

American Speed-Set

METAL NUMBERING MACHINES

MODEL P-5
MULTI-WHEEL SPEED SET

Write for new catalog of special machines for all kinds of metal numbering.



Wheels Revolve Either Forwards or Backwards Any Combination Almost Instantly

AMERICAN NUMBERING MACHINE CO.
224 SHEPHERD AVENUE, BROOKLYN, N. Y.
105 W. MADISON STREET CHICAGO, ILL.

Pipe Lines

La Mesa, Lemon Grove & Spring Valley Irrigation District, 4769 Spring Street, La Mesa, Cal., asks bids until Jan. 28 for about 10,400 ft. of 48-in. for steel pipe line from El Capitan dam on San Diego River, near Lakeside, Cal., to point near La Mesa, for water supply for district. Fund of $128,000 has been arranged through bond issue and Federal aid. C. S. Harritt is general manager and chief engineer.

Old Dutch Oil Co., Muskegon, Mich., has authorized new welded steel pipe line from Crystal oil field district, Montcalm County, to Butternut, Mich., about 11 miles, for crude oil supply, to be handled from latter point in tank cars to refinery at Muskegon.

Michigan-Toledo Pipe Line Co., Mount Pleasant, Mich., recently organized to build welded steel pipe line from Crystal, Mich., oil field district to Toledo, Ohio, for crude oil supply for refinery of Standard Oil Co. of Ohio at latter place, plans new connecting steel pipe line from point near Dundee, Mich., to Trenton, Mich., about 35 miles, for crude oil service at refinery of White Star Refining Co., at last noted place.

Hutchinson, Kan., has called special election Jan. 28 to approve bonds for $564,138 for steel pipe lines for gas distribution, including distributing station. Cost amount of bond issue. H. P. Hertz is city engineer.

Gulf Pipe Line Co., Gulf Building, Houston, Tex., has authorized 6-in. welded steel pipe line from Rodessa, La., oil field district to pumping station near Mooringsport, La., about 18 miles, for crude oil transmission. Company is affiliated with Gulf Refining Co., address noted and Pittsburgh.

Phillips Petroleum Co., Bartlesville, Okla., is considering 6-in. welded steel pipe line in Lottie and Kate Streets, Oklahoma City, about 35,000 ft. in all, for crude oil transmission. Cost close to $75,000.

Arkansas-Louisiana Gas Co., Ardus Building, Shreveport, La., plans new 8-in. welded steel pipe line between Caddo and Rodessa, La., oil field districts, about 14 miles, for crude oil supply.

Rodessa Oil & Refining Co., Rodessa, La., plans welded steel pipe line from local oil field district to Cedar Grove, for crude oil supply for refining plant at that point, formerly operated by Crystal Oil Refining Co.

Cast Iron Pipe

Boston has awarded 600 tons of 8 to 12-in. to Warren Foundry & Pipe Co. Recently the city awarded 1800 tons to the same company.

Montreal Water Board, Montreal, Que., closes bids Jan. 29 for pipe for water system and other waterworks installation.

Athol, Mass., will soon take bids for pipe for water system and other waterworks installation. Cost close to $100,000. Tighe & Bond, 180 High Street, Holyoke, Mass., are consulting engineers.

Norfolk, Va., plans new 20-in. line in part of Seventeenth Street for water system. Fund of $60,000 is being arranged for this and other water system and sewerage installation.

Gloucester Sanitary District No. 1, Gloucester, Va., plans pipe lines for water system and other waterworks installation. Fund of $34,000 is being arranged through Federal aid and bond issue.

Cayce, S. C., plans about five miles for water system, including line across Congaree River; also other waterworks installation. Cost about $45,000.

Birmingham, Ala., plans pipe lines for water supply for industrial service, including trunk line from Black Warrior River, near Remlap, to city limits. Project will include pumping plant, reservoirs and other waterworks structures. Cost close to $6,000,000, of which $2,300,000 has been secured through Federal grant. A. Clinton Decker and O. G. Thurlow, Birmingham, are consulting engineers; J. D. Webb is city engineer.

Dallas, Tex., plans pipe lines for extensions and replacements in water system; also installation of new filter equipment at Bachman waterworks station. Cost about $200,000.

Board of Lake County Commissioners, Painesville, Ohio, plans pipe lines for water system, including 8 and 10-in. and smaller. Cost $84,650, part of fund to be secured through Federal aid. Paul Cook, Painesville, is engineer.

Kellogg, Minn., plans about three miles of various sizes for water system; also 50,000-gal. elevated steel tank and tower and pumping machinery. Fund of $32,700 has been arranged through Federal aid. Bruar & Milinowski, Globe Building, St. Paul, Minn., are consulting engineers.

Virginia, Minn., plans new 8 and 12-in. pipe for water system in several streets. Cost about $113,000. Financing is being arranged through Federal aid.

Rewey, Wis., plans pipe lines for water supply; also other waterworks installation. Fund of $17,000 is being arranged.

Mina, Nev., plans pipe lines for water system; also other waterworks equipment. Fund of $39,364 is being arranged, part to be secured through Federal grant.

Baxter Springs, Kan., plans about 10,000 ft. of various sizes for water system. Financing has been completed. F. G. Willis is city engineer.

Calexico, Cal., plans pipe line extensions and replacements for water supply; also pumping machinery and auxiliary equipment. Cost about $23,000, part of appropriation to be secured through Federal aid.

Oakland, Cal., will open bids Jan. 22 on 670 tons of 4 and 6-in.

Fullerton, Cal., has awarded 103 tons to American Cast Iron Pipe Co.

Tacoma, Wash., has placed 110 tons of 6 to 18-in. with United States Pipe & Foundry Co.

Fresno, Cal., has taken bids on 275 tons on which United States Pipe & Foundry Co. is low bidder.

Sunset, Utah, has opened bids on 110 tons of 4 and 6-in.

Nephi, Utah, has opened bids on 245 tons.

San Francisco has opened bids on 200 tons of 6 to 12-in.

Railroad Equipment

Seaboard Airline has placed order with Baldwin Locomotive Works for one 0-4-0 switching locomotive and six 16,000 gal. locomotive tenders.

National Railways of Mexico are considering the purchase of four or five 2-8-0 locomotives.

Chicago, Burlington & Quincy is constructing three locomotives of 4-8-4 type in its own shops.

Bessemer & Lake Erie will ask for tenders on or prior to Jan. 15 for 10 locomotives of the 2-10-4 type, one Diesel-electric switching locomotive, and four eight-wheel steam switching locomotives.

Union Railroad Co., subsidiary of Bessemer & Lake Erie, will receive bids on or before Jan. 15 for five 10-wheel switching locomotives and five six-wheel switchers.

New York, New Haven & Hartford has ordered five 100-ton, 660-hp. Diesel-electric switching locomotives from Cooper-Bessemer Corpn. and five 100-ton, 600-hp. Diesel-electric switching locomotives from Ingersoll-Rand Co.

Lehigh Valley plans to build 250 coal cars and to rebuild 750.

Treasury Department, Washington, will take bids Jan. 21 on five 18-ton gasoline, mechanical-drive industrial locomotives for delivery at municipal airport, Philadelphia.

RAILS AND TRACK SUPPLIES

Southern Railway System has ordered 3000 tons of 100-lb. rails from Tennessee Coal, Iron & Railroad Co. This order is in addition to 10,000 tons of 130-lb. sec-

tions bought by the Southern from the Tennessee company last November. The Southern has also purchased 1200 tons of tie plates and other track accessories from Tennessee company.

Illinois Central has placed 2300 tons of rails with Inland Steel Co., 2300 tons with Carnegie-Illinois Steel Corpn. and 3000 tons with Tennessee Coal, Iron & Railroad Co.

Southern Pacific has bought 47,769 tons of 112 lb. and 131-lb. rails and 10,000 tons of bolts, spikes and tie plates, dividing the orders among Columbia Steel Co., Bethlehem Steel Co. and Colorado Fuel & Iron Co.

County-City Purchasing Agent, Seattle, Wash., has opened bids on 500 tons of 82-lb. rails.

Operations Dip At Buffalo

BUFFALO, Jan. 14.—Open-hearth operations are somewhat lower than last week, with Bethlehem's Lackawanna plant operating 12 in place of 13; Republic Steel Corpn., four, and Wickwire Spencer Steel Co., one. The Seneca sheet division of Bethlehem continues to operate at 90 per cent, while the new sheet and strip mill has not yet gone into production, except for trial rollings.

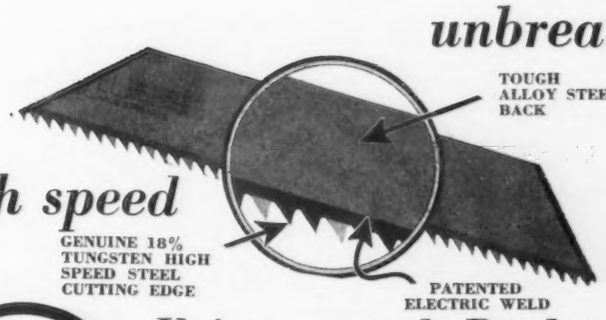
Somewhat of a lull has occurred in the fabricated structural and reinforcing bar fields. About all that is now current in the way of business are three schools at Angola, West Valley and North Tonawanda, involving around 300 tons of shapes and about 150 tons of bars.

Pig iron business is quiet, with foundries fairly busy, but not doing much new buying. Blast furnace operations are: At Lackawanna, three; at Republic, one; at Hanna Furnace Corpn., two, and at Tonawanda, one.

The scrap market has been very quiet, though prices have maintained their strength. The influence of outside markets, which are strong, has helped to bring this about. Dealers profess to have no interest in selling at prices now quoted.

Safety Record Is Sought by J. & L.

MORE than 27,000,000 man-hrs. of work have been completed from April 25, 1934, to date in the Aliquippa, Pa., works of the Jones & Laughlin Steel Corpn. without a fatal accident. The 10,000 employees in the plant are now striving to better a previous record of 28 months without a fatal accident made in April 2, 1931 to Aug. 26, 1933, when more than 30,000,000 man-hrs. of safe operation were completed. During that period 18 employees lost their lives in accidents outside the plant, compared with 15 fatalities in the latest period reported.



MARVEL

High-Speed-Edge
HACK SAW BLADES

Uninterrupted Production at Full Capacity! **Only MARVEL High-Speed Edge Blades can be both strictly High Speed and at the same time *positively unbreakable*, for only MARVEL Blades have a genuine 18% Tungsten High Speed Steel edge integrally molded to an unbreakable tough alloy steel back. This combination of cutting quality and strength assures longer blade life and more cuts per blade . . . permits higher speeds and far greater feed pressures . . . permits uninterrupted production at capacity on any sawing machine.**

Write for Catalog.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
349 W. Francisco Ave., CHICAGO, U. S. A.

Metal Manufacture Adds to Permanent Wealth of Nation

(CONCLUDED FROM PAGE 23)

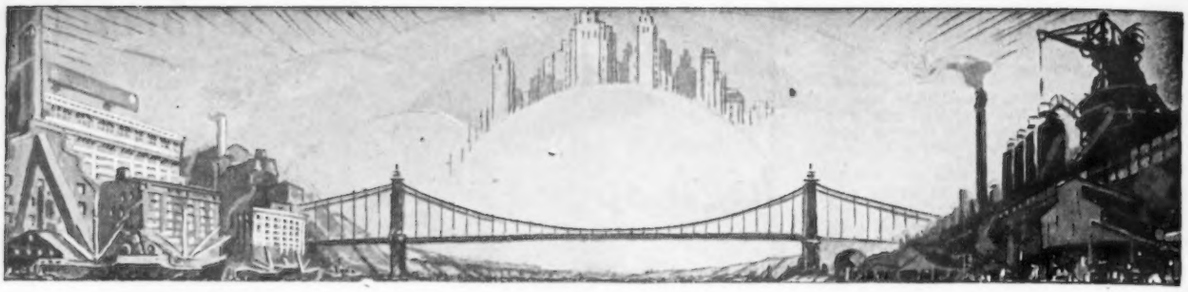
terials and by the time they actually enter into use their value is enhanced many fold. For example, iron ore may sell for $2.50 a ton but when 2 tons of it, say $5 worth, are made into steel the value increases to between $30 and $100, perhaps $60 on an average, before it even leaves the steel mills as a raw material for manufacturing industries. Further fabricated into an automobile, its worth grows to $500 or more and perhaps some of it may be fashioned into a watch spring worth $2,000,000,000 a ton. The further mineral raw material gets from the mine, whether in degree of fabrication or physical distance, the more its value grows. To make the value grow, however, more work has to be done upon it or it has to be carried by train, truck, or ship to some other place."

Minerals Provide Employment for Large Population

Dr. Finch then developed the importance of minerals and their fabrication from the point of employment, wages, dividends, etc., to show that the mining industries provide the real source of subsistence for a very large and representative cross-section of the population.

In opening his remarks, Dr. Finch said that since the beginning of the nineteenth century, the United States has produced more than 1,000,000,000 oz. of gold, about 12,000,000,000 oz. of silver, 40,000,000,000 lb. of zinc, 100,000,000,000 lb. of copper and 135,000,000,000 lb. of lead.

"It ranks first in the world in lead, zinc and copper output and in the consumption of metals of all kinds," he said. "Non-ferrous metals, however, represent scarcely one-fourth the value of our mineral output; the balance is supplied by iron, coal, oil and non-metallic minerals. Our share in the consumption of the world's pig iron was 47 per cent, of coal, 37 per cent, and of petroleum, 75 per cent. To keep step with an expanding industrial life—until the depression hit us—our mineral output increased in annual value by 77 per cent in the last quarter century, whereas farm production rose only 17 per cent."



Plant Expansion and Equipment Buying

Improvement in Machine Tool Purchases Is Encouraging—Inland Steel Buys

THE machine tool market seems to have recovered entirely from the holiday lull and business during the last week has been quite encouraging. Of outstanding interest were purchases by the Inland Steel Co., Chicago, of a number of tools for its machine shop. Included were five lathes, a number of grinders and several milling machines.

The Fisher Body Corpn. took bids on the remaining press equipment for its Grand Rapids, Mich., plant which will cost from $500,000 to $600,000. Some very large presses had already been bought. Other General Motors units, as well as Ford, are still buying machinery and scattered replacement programs are sustaining business in the Detroit area.

NORTH ATLANTIC

Seagram Distillers Corpn., 405 Lexington Avenue, New York, and Joseph E. Seagram & Sons, Inc., same address, affiliated, have let general contract to J. & E. Warm Co., 2335 Florence Avenue, Cincinnati, for new distilling plant on 40-acre tract near Bernheim Lane, Louisville, recently acquired. Project will include power house, machine shop and other mechanical units, also four multi-story buildings for storage and distribution. New plant will be operated by Calvert Distilling Co., Inc., first noted address, a subsidiary of Seagram companies. Cost close to $1,500,000 with equipment. Joseph & Joseph, Breslin Building, Louisville, are architects.

Pan-American Petroleum & Transport Co., 122 East Forty-second Street, New York, has approved plans for two multi-unit additions at oil refinery at Texas City, Tex., in connection with expansion now in progress at plant. New units will operate under polymerization process. Project will include battery of steel tanks and auxiliary facilities for storage and distribution. Contracts for certain work have been let to Foster-Wheeler Corpn., 165 Broadway, and M. W. Kellogg Co., 225 Broadway, both New York, and awards for other equipment will be placed soon. Cost over $1,000,000.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Jan. 21 for parts for gasoline engines (Circular 117).

Monarch Wine Co., 101 Wooster Street, New York, has acquired building at 643 Glenn Street, Atlanta, Ga., and will remodel for new winery. Cost close to $100,000 with equipment. New company is being organized of same name under Georgia laws, to operate local plant, in which W. R. Tucker, president, Montezuma Frozen Fruits Co., Montezuma, Ga., will be interested.

Kelly Wire Die Corpn., 256 West Thirty-first Street, New York, has leased space in building at 17 West Thirty fourth Street for plant.

Purchasing and Contracting Officer, Medical Section, Army Base, Brooklyn, asks bids until Jan. 29 for steel shelving, including uprights, bolts, nuts, etc. (Circular 53).

National Distillers Products Corpn., 120 Broadway, New York, has engaged Sanderson & Porter, 52 William Street, engineers, to prepare plans for extensions and improvements in former E. H. Taylor Distillery, Frankfort, Ky., recently acquired. New units will be built and additional equipment installed. Cost close to $400,000.

Oldetyme Distillers Corpn., 122 East Forty-second Street, New York, has acquired plant of Hiram Walker & Sons, Inc., 629 Grove Street, Jersey City, N. J., for new blending, bottling and distributing works. Present capacity of 6000 cases a day will be doubled by new owner with installation of new equipment.

Sonolux Co., 3 Central Avenue, East Newark, N. J., manufacturer of motion picture equipment, parts, etc., has leased two-story building at 9-11 Central Avenue for new works, increasing present capacity.

Conte Casket Co., 280 Pleasant Avenue, New York, manufacturer of metal caskets, etc., has purchased former factory of McLaurin-Jones Co., foot of McClellan Street, Newark, N. J., comprising main five story building and several smaller structures, about 40,000 sq. ft. floor space, and will remodel for new plant.

Commanding Officer, Picatinny Arsenal, Dover, N. J., asks bids until Jan. 24 for practice bombs, smoke charge assemblies, etc. (Circular 176).

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has plans for new oil refinery at Atreco, near Beaumont, Tex., where site has been selected on Neches River. It will consist of several units to operate under polymerization process, with cracking plant for gasoline production. Project will include steel tanks and auxiliary equipment for storage and distribution, power house, machine shop and other mechanical departments. Cost over $2,000,000 with machinery.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Jan. 20 for one plate-type shaper vise (Circular 293); until Jan. 21 for rework of 122,000 lb. gilding metal clippings into annealed gilding metal, 20,000 lb. gilding metal trimmings into annealed gilding metal, and 250,000 lb. metal into annealed gilding metal (Circular 280), rework metals into 8000 lb. spring brass and 30,000 lb. clip body brass (Circular 281), rework metals into 300,000 lb. cartridge brass cups (Circular 282).

Lancaster Iron Works, South Prince Street, Lancaster, Pa., plans rebuilding of part of plant recently damaged by fire. Loss over $50,000 with equipment.

SOUTHWEST

Canadian Mill & Elevator Co., El Reno, Okla., has let general contract to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for new six-story mill and elevator, 36 x 100 ft., with elevating, conveying, screening and other mechanical equipment. Cost close to $125,000. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Cupples-Hesse Envelope Co., 4173 North Kingshighway, St. Louis, has engaged Koerner Engineering Co., Syndicate Trust Building, engineer, to prepare plans for two-story addition, 135 x 180 ft., for expansion in paper converting department, bids to be asked soon on general contract. Cost about $100,000 with equipment.

Board of Education, School District No. 6, Shawnee Mission, Kan., care of Joseph W. Radotinsky, Commercial National Bank Building, Kansas City, Kan., architect, plans manual training department in new three-story and basement central high

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Give your first shipment of Cleveland Cap Screws any tests you please. Your micrometers are just as accurate as ours and we are willing to have you form your opinion of our products by your own yardsticks. If you have a testing machine, let it tell you how uniformly our products are made. Wrench-fits you will find are always accurate, providing for faster assembly. Made by the Kaufman Process, *patented*, these fine cap screws offer you a Class 3 fit and a tensile strength suitable for every demand you will make. Order through your Distributor, our nearest warehouse or from the Factory.

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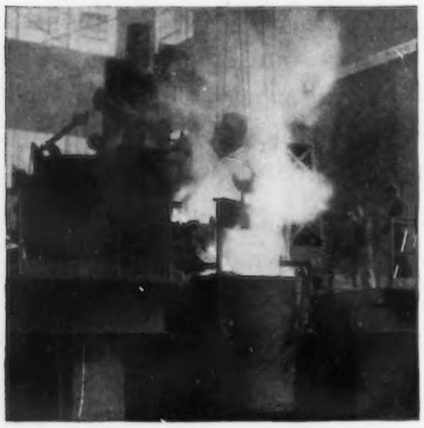

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NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

school, for which general contract has just been let to Straub & Kelisky Co., Gloyd Building, Kansas City, Mo. Cost close to $170,000.

Petrotex Co., Texas City, Tex., oil refiner, has plans for new gasoline refinery on local site, with power house and other mechanical departments. Cost close to $350,000 with machinery. Mid-Continent Engineering Co., First National Bank Building, Dallas, Tex., is consulting engineer.

City Council, Wichita Falls, Tex., has called special election Feb. 8 to approve financing in amount of $1,750,000 for new municipal electric light and power plant, and distributing lines. Fund will be secured through Federal loan.

Roeglin Provision Co., 1009 East Commerce Street, San Antonio, Tex., meat packer, will receive bids until Jan. 21 for new one-story packing plant, 35 x 110 ft. Cost over $50,000 with equipment. Marvin Eickenroht, Maverick Building, is architect; L. D. Royer, Smith-Young Tower Building, is consulting engineer.

NEW ENGLAND

Hodgman Rubber Co., Herbert Street, Framingham, Mass., has let general contract to Julius J. Conviser, 333 Washington Street, Boston, for two-story and basement addition, 60 x 110 ft. Cost over $45,000 with equipment. Isidore Richmond, 248 Boylston Street, Boston, is architect.

Commanding Officer, Springfield Armory, Springfield, Mass., asks bids until Jan. 20 for six automatic motor-driven milling machines (Circular 94).

Ludlow Mfg. Associates, Ludlow, Mass., manufacturers of jute and cotton webbing, burlap products, etc., have let general contract to Barclay White Co., 22 North Thirty-sixth Street, Philadelphia, for initial units for new plant on 53 acre tract at Edge Moor, Del., recently acquired, comprising main two-story mill, 356 x 400 ft., with four one-story adjoining structures, 80 x 350 ft. Entire project will cost close to $1,500,000 with machinery.

General Electric Co., Bridgeport, Conn., has let additional contracts to Gellatly Construction Co., Housatonic Avenue, for two one-story additions, 80 x 112 ft., and 80 x 96 ft., making three extensions to be built, including previously noted one-story unit, 80 x 100 ft. Cost over $65,000 with equipment. Headquarters of company are at Schenectady, N. Y.

School Board, Somerset, Mass., plans manual training department in new two-story junior and senior high school. Cost over $175,000. Israel P. Almy, 49 Purchase Street, Fall River, Mass., is architect.

SOUTH ATLANTIC

Savannah Wire Weaving Co., Savannah, Ga., recently organized by Julian Howell, Atlanta, Ga., and associates, has plans for one-story plant at Port Wentworth, near Savannah, for manufacture of copper and galvanized iron wire screens, etc. Cost about $25,000.

Georgia Power Co., Atlanta, Ga., plans over 400 miles of power transmission and distributing lines in 1936, including two main high-tension lines from Bartlett's Ferry to Columbus, and from Americus to Tifton, Ga. respectively about 77 miles; and lines for rural electrification in different parts of State, including power substation and service facilities. Cost over $500,000.

Star Provision Co., 600 Marietta Street, Atlanta, Ga., meat packer, has let general contract to A. K. Adams Co., 542 Plum Street, N. W., for new two-story plant. Cost over $30,000 with equipment. H. P. Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

WESTERN PA. DIST.

Pittsburgh-Erie Saw Corpn., 4017 Liberty Avenue, Pittsburgh, has let general contract to Ted R. Cooper Co., Western Pacific Building, Los Angeles, for one-story addition, 50 x 60 ft., to branch plant at Los Angeles, with two smaller adjoining one-story buildings. Cost about $30,000.

Wettach Paint & Chemical Co., Carnegie, Pa., recently organized by C. D. and William Wettach, Carnegie, and associates, has purchased former local plant of H. L. Dixon Co., Rosslyn Road, comprising main factory unit, 100 x 150 ft., and several smaller structures. New owner plans enlargement and improvements. Cost over $50,000 with machinery. C. D. Wettach is president.

Appalachian Electric Power Co., Roanoke, Va., plans addition to steam-operated electric power plant at Logan, W. Va., including extensions in transmission lines. Cost close to $3,000,000. General Electric Co., Schenectady, N. Y., will furnish main turbo-generator unit. Company is a unit of American Gas & Electric Co., 30 Church Street, New York.

SOUTH CENTRAL

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Jan. 27 for one 100,000-gal. steel storage tank for construction camp at Guntersville Dam; until Jan. 29, two 10-panel switchboards for Guntersville and Chickamauga Dam; until Jan. 22, main control switchboards, auxiliary control switchboards, terminal boards, hydraulic gage boards, transformers and accessory equipment for Wheeler Dam power plant.

Lookout Oil & Refining Co., Chattanooga, Tenn., manufacturer of cottonseed oil and kindred oil products, plans expansion and improvements at local plant, including additional equipment. Cost over $85,000. Company is a subsidiary of Armour & Co., Union Stock Yards, Chicago. R. E. Biggers is manager at Chattanooga.

Falls City Brewing Co., Thirty-first Street and Broadway, Louisville, has asked bids on general contract for four-story addition for storage and distribution. Cost close to $100,000 with equipment. Plans are also under way for one-story addition to mechanical bottling division, for which bids will be asked later. Cost over $45,000 with machinery. Walter C. Wagner, Breslin Building, is architect and engineer.

Southern Naval Stores Co., Columbia, Miss., manufacturer of rosin and other naval stores, has approved plans for one-story steam solvent unit. Cost over $40,000 with machinery.

Glencoe Distillery Co., Inc., 723 South Twenty-sixth Street, Louisville, is considering extensions and improvements, including additional equipment. Cost about $35,000.

BUFFALO DISTRICT

Corning Glass Works, Corning, N. Y., manufacturer of technical glass products, will erect one-story addition, 80 x 240 ft., by day labor, for manufacture of fibrous glass specialties. Installation will include glass-melting furnace and auxiliary machinery for capacity of 24 tons a day. New steam power house, 36 x 50 ft., will be built for processing service. Cost close to $100,000 with equipment.

Tonawanda Boxboards, Inc., Tonawanda, N. Y., plans rebuilding part of storage and distributing building recently destroyed by fire. Loss close to $50,000 with equipment.

American Radiator Co., 1807 Elmwood Avenue, Buffalo, has filed plans for several one-story additions, work to be carried out in connection with general expansion and improvements now under way. Entire project will cost over $500,000 with equipment. Company headquarters are at 40 West Fortieth Street, New York.

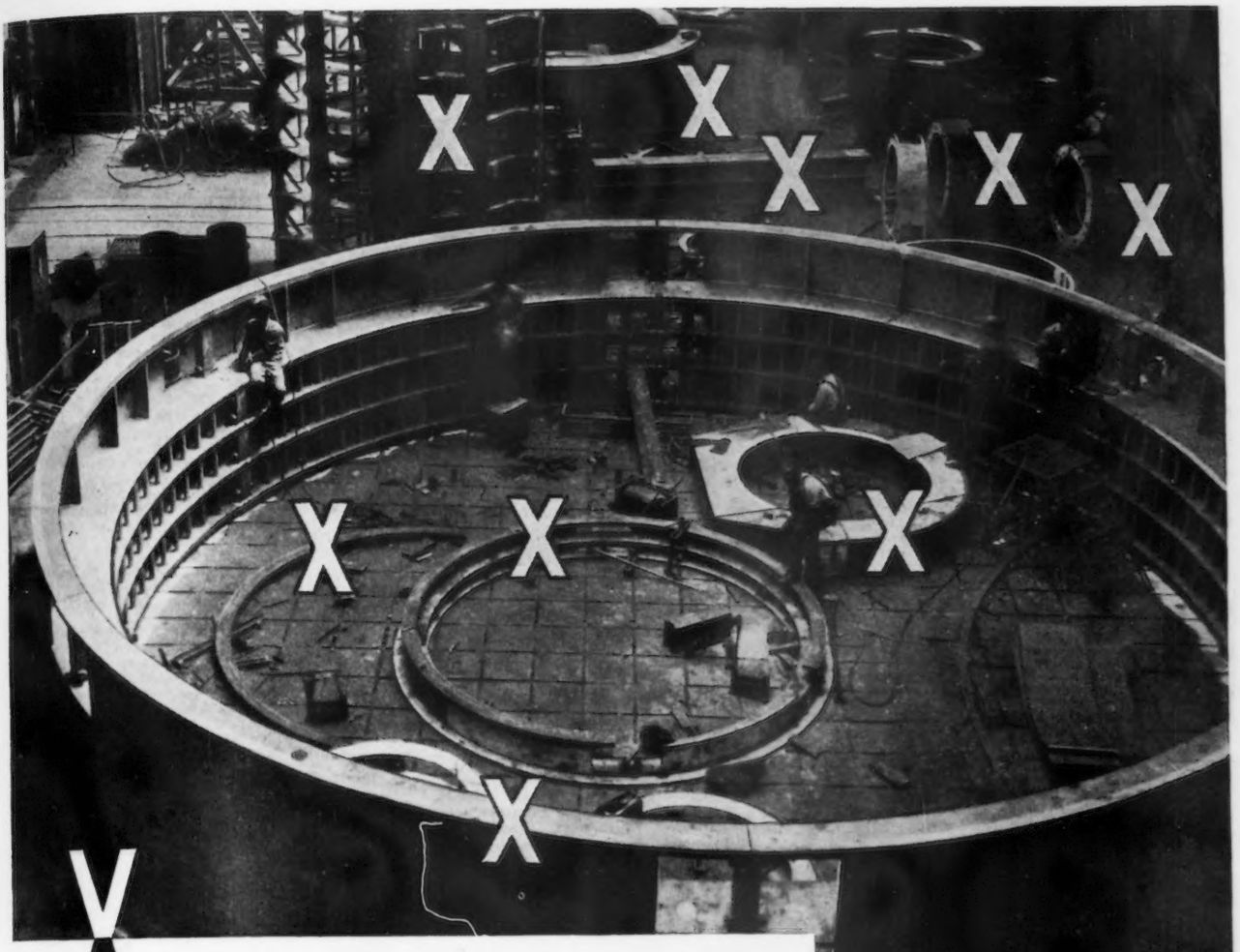
WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Feb. 3 for motor truck parts (Circular 84); until Feb. 4 for other motor truck parts (Circular 86).

Bureau of Aeronautics, Department of Commerce, Washington, plans airport and landing field at Magnolia, Harford County, Md., including hangars with repair and reconditioning facilities, oil storage and distributing buildings and other units. Cost close to $500,000 with equipment.

Board of School Commissioners, 3 East Twenty-fifth Street, Baltimore, plans manual training department in new three-story Eastern high school in Venable Park, for which bids have been asked on general contract. Cost $1,400,000. Herbert G. Crisp and James R. Edmunds, Jr., both Calvert Building, are architects.

Purchasing Officer, Department of Interior, Eighteenth and F Streets, N. W., Washington, asks bids until Jan. 20 for nine electric bench drill stands, 20 aligners, eight trestle cranes, six air compressors, 25 3-ton hydraulic jacks, 45 4½-ton jacks, 17 transmission jacks, four 25-ton and five 35-ton presses, nine boring bars, 30 electric drills, 14 grinders and buffers, 11 portable growlers, six brake liner ma-



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chines, seven valve refacer machines, 18 electric battery chargers, four cylinder hones (Proposal 1178).

American Agricultural Chemical Co., 104 West Baltimore Street, Baltimore, has let general contract to Davis Construction Co., 9 West Chase Street, for two-story addition, 45 x 78 ft. Cost over $30,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 21 for copper-nickel alloy air cylinder forgings (Schedule 6949) for Washington Navy Yard; pneumatic hose (Schedule 6924), shaft and master indicators, frequency control equipment, tools and spare parts (Schedule 6943), pressure gages (Schedule 6945), corrision-resisting steel grating (Schedule 6946); until Jan. 24, one hand operated turret-type portable punch (Schedule 6952), steel valves (Schedule 6964), drawing instruments, rulers, scales, etc. (Schedule 6942), files (Schedule 6956), cotter pins, escutcheon pins and taper pins (Schedule 6960) for Eastern and Western navy yards.

MICHIGAN DISTRICT

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of steel automobile bodies, has let general contract to Martin Krausmann Co., 955 East Jefferson Street, for one-story addition to die works. Cost over $50,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Board of Education, Ann Arbor, Mich., plans manual training department in new three-story junior high school in West Side district, for which general contract has been let to H. J. Hochrein & Son, Ann Arbor. Cost about $245,000.

Naph-Sol Refining Co., Muskegon, Mich., plans early rebuilding of portion of storage and distributing department recently destroyed by fire. Loss about $80,000 including steel tanks and other equipment.

Public Lighting Commission, 174 East Atwater Street, Detroit, plans extensions and improvements in municipal transmission and distributing lines, including new lines for electrical service in outlying districts. Fund of 818,100 has been arranged, including Federal grant of $283,100. Work will begin soon.

Bastian-Blessing Co., Grand Haven, Mich., manufacturer of soda fountain parts and equipment, carbonating machinery, etc., has work under way on one-story addition, totaling about 25,000 sq. ft., for increased production. Extensions will also be made in storage and distributing division. Cost over $65,000 with equipment.

OHIO AND INDIANA

National Carbon Co., Madison Avenue and West 117th Street, Cleveland, manufacturer of arc lamps and arc welding equipment, carbon brushes, etc., has let general contract to Gilmore-Carmichael-Olson Co., 1873 East Fifty-fifth Street, for new one-story plant, 100 x 100 ft., at Fostoria, Ohio. Cost about $60,000 with equipment.

Muskingum Fiber Products Corpn., Coshocton, Ohio, care of N. H. Carpenter, Coshocton, recently organized, has acquired about 70 acres near city limits, fronting on Muskingum River, for new mill for manufacture of strawboard, paperboard and corrugated board. Plant will consist of several one story units, with power house and other mechanical structures. Cost close to $100,000 with machinery, work to begin early in spring. Fred A. Jacobs, Coshocton, is architect. Mr. Carpenter, noted, will be president.

Ohio Rubber Co., Willoughby, Ohio, manufacturer of molded rubber products, has let general contract to C. A. White Co., Stevens Boulevard, for one-story addition, 56 x 140 ft. Cost over $40,000 with equipment.

Elyria Belting & Machinery Co., Elyria, Ohio, has acquired one-story factory at Sandusky, Ohio, and will remodel for new metal-working plant for rebuilding and repair of used machinery.

Board of Education, East Palestine, Ohio, plans manual training department in new two-story senior high school, for which general contract has been let to Felis Pesa & Sons Co., Youngstown, Ohio. Cost $200,000. Financing has been arranged through bond issue and Federal aid.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, asks bids until Jan. 21 for 11 controllable propeller pitch adjuster assemblies (Circular 478), 10 temperature regulators (Circular 470); until Jan. 24, three motor-driven automatic saw filers (Circular 475); until Jan. 27, six universal tool grinders, one flat surface grinder, and one tool and cutter grinder (Circular 462); until Jan. 30, 400 gun control switch assemblies (Circular 477).

Schwitzer-Cummins Co., 1125 Massachusetts Avenue, Indianapolis, manufacturer of fans, superchargers, stokers and kindred products, has plans for two or more one-story additions. Cost over $40,000 with equipment.

City Council, Mount Vernon, Ind., asks bids until Jan. 24 for equipment for new municipal gas plant. Cost about $60,000. D. T. Blakey, Acme Hotel, Evansville, Ind., is consulting engineer.

MIDDLE WEST

Brevolite Lacquer Co., Twentieth Street and Sheridan Road, North Chicago, Ill., has let general contract to Campbell, Lourie & Lautermilch Corpn., 400 West Madison Street, for three-story addition, 50 x 80 ft., for manufacturing service and one-story unit adjoining for storage and distribution. Cost over $50,000 with equipment. Company is an interest of Atlas Powder Co., Wilmington, Del.

United States Engineer Office, Milwaukee, closes bids Jan. 21 for one 3-cu. yd. clamshell dredging bucket (Circular 110).

Hoerber Brewing Co., 1617 West Twenty-first Place, Chicago, has asked bids on general contract for one-story addition, primarily for storage and distribution. Cost close to $30,000 with equipment. Meyer & Cook, 820 North Michigan Avenue, are architects.

Minnesota Valley Canning Co., LeSueur, Minn., food canner, has plans for one-story branch canning plant, 85 x 112 ft., with steam power house, 24 x 40 ft., at Cokato, Minn. Cost about $35,000 with equipment. Henry C. Gerlach, 414 North Fourth Street, Mankato, Minn., is architect.

St. Paul Welding & Mfg. Co., 174 West Kellogg Boulevard, St. Paul, Minn., has plans for one-story addition to welding works, 40 x 100 ft. M. A. Wright, 288 Bunker Street, is architect.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Jan. 21 for battery clips, connecting blocks and other supplies (Circular 30).

Bureau of Reclamation, Denver, asks bids until Jan. 20 for heavy type 69,000-volt circuit breaker and six 69,000-volt disconnecting switches and accessories for Casper-Alcova project, Casper, Wyo. (Specification 757-D).

Schoitz Tool, Gear & Machine Works, 223 Sixth Street West, Waterloo, Iowa, has acquired adjoining property and will remodel for extensions in machine shop division. Work to begin early in spring.

Monarch Tool & Die Works, 845 West Juneau Avenue, Milwaukee, is taking bids through Mark F. Pfaller, local architect, for new shop, 52 x 120 ft., one story, at North Fratney Street and West Vienna Avenue, to cost about $25,000 with equipment.

Line Material Co., South Milwaukee, Wis., manufacturer of transmission line equipment, has purchased from Dodge Mfg. Co., Mishawaka, Ind., plant at Oneida, N. Y., which it has been occupying under lease. Improvements are planned in buildings, containing 100,000 sq. ft. Jack Dowling is Oneida branch manager.

Milfound Co., Waupun, Wis., manufacturer of gray iron castings, has placed contracts for erection of new foundry, costing about $30,000 with equipment, to replace frame shop burned several weeks ago. A. G. Gibbons is manager.

Charles H. Hempel, formerly lacquer expert for Aluminum Goods Mfg. Co., Manitowoc, Wis., has organized Heresite & Chemical Co., with capital stock of $25,000 to engage in production of chemical products, principally metal coatings, varnishes and finishes. New company has acquired former Martz Knitting mill and is purchasing equipment.

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NEW TRADE PUBLICATIONS

Arc Welding. — Lincoln Electric Co., Cleveland. Booklet, 42 pages, devoted to automatic arc welding by the Electronic Tornado process. Applications in various industries are illustrated and described, and procedure, weld properties and other data are included.

Lathes.—South Bend Lathe Works, South Bend, Ind. Booklet, 24 pages, entitled "Interesting Installations," includes attractive bleed page close-ups of South Bend lathes in actual use, including the machine shop that serves the Palmolive Building, Chicago, and the powerful Lindbergh aviation beacon atop of it.

Photoelectric Devices.—Pfaltz & Bauer, Inc., 300 Pearl Street, New York. Three circulars devoted to "blocking layer" photoelectric cells, ocular photocells, and a new universal Lange photoelectric colorimeter respectively.

Screws, Bolts and Nuts.—Pheoll Mfg. Co., 5700 Roosevelt Road, Chicago. Attractive 104-page catalog presenting price lists and illustrations of screws, bolts, nuts and other standard and special products, furnished in a wide variety of materials. The catalog is thumb-indexed, and includes more than 30 pages of highly useful reference data, such as American standards for screw threads, weight tables, decimal equivalents and discount multipliers.

Texsteel Sheaves. — Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 2188A, 16 pages, giving details of recently extended line of Duro Brace Texsteel sheaves for stock drives up to 15 hp. Tables of dimensions, horsepower and center distances, and price lists of the two to six groove sheaves are included.

Compressors. — Ingersoll-Rand Co., 11 Broadway, New York. Bulletin No. 3162, 36 pages describing the company's horizontal duplex, double-acting, cross-head type, moderate speed, heavy-duty compressors. Capacities range from 50 to 250 hp., and types covered are the XRE, which are direct-connected, synchronous motor-driven units; and the XRB and XCB, which are belt driven.

Physicists Research Co., Ann Arbor, Mich., has announced its formation in field of applied technical research with experience, personnel and facilities available for diagnosis, development and application of practical industrial work. Company will function both in consulting capacity and as specialist in solution of unusual industrial problems. Earnest J. Abbott, formerly research physicist, University of Michigan, is president.

Chain.—International Chain & Mfg. Co., York, Pa. Catalog, No. 20. Illustrates and details the various types of chain manufactured by the company. Includes comparative tables of sizes in W & M wire gage and decimals.

Nails.—Angel Nail & Chaplet Co., Cleveland. Catalog. A combination of text and illustrations dealing with the production of nails, an analysis of type defects and recommendations covering purpose selections.

Controls.—Brown Instrument Co., Philadelphia. Catalog No. 8900, "Brown Air Operated Controllers." Descriptive of Air-o-Line, full throttler, throttler and on-off devices providing automatic graduated dial control for temperatures, pressures, flows and liquid levels in many industrial fields.

Gear Grinder. — Pratt & Whitney Co., Hartford, Conn. Bulletin. Describes the company's 10-in. hydraulic grinder for the grinding of spur and helical gears. Presents the development of gears and gear treatment.

Pillow Blocks. — SKF Industries, Inc., Philadelphia. Booklet. Illustrations, descriptions, drawings and tables covering a new line of "S A" type, heavy duty pillow blocks for use in conjunction with spherical roller bearings. Gives full specifications for installation.

Bronzes. — Johnson Bronze Co., New Castle, Pa. Catalog. Forty pages, three sections, fully illustrated. Presents the company's 1936 lines of bearings, bushings

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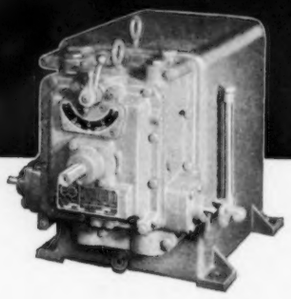

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and maintenance bronzes, including machined bars both cored and solid.

Expansion Joints.—Yarnall-Waring Co., Chestnut Hill, Philadelphia. Bulletin. Cut away illustrations and detailed descriptions of "Gun-Pakt" expansion joint applications. Compact tables of standardized information relating to pressures, traverse and sizes.

Sludge Pumps.—Morris Machine Works, Baldwinsville, N. Y. Bulletin, No. 156. Describes centrifugal pumps and methods for handling slurry, sludges, fine abrasives and gritty mixtures and details special design and construction for easy replacements. Sectional views illustrate component parts assembly and text gives full operating and replacement information.

Pumps.—Allis-Chalmers Mfg. Co., Milwaukee. Leaflets, in series, descriptive of low head, large high head, small types and multi-stage double suction single stage centrifugal pumps. Cut-away illustrations and drawings are symboled in providing full information as to details of assemblies.

Turbine Pumps.—Pomona Pump Co., 206 East Commercial Street, Pomona, Cal. Catalog. A detailed treatise, liberally illustrated with cuts, diagrams and tables, covering pumping service from 15 to 7000 gallons per min.—depths to 1000 ft. Water lubricated vertical units.

Lathes.—South Bend Lathe Works, South Bend, Ind. Catalog, No. 94-A. Fully descriptive of the company's lathes, attachments and metal working equipment. Covers Standard lathes, workshop, junior and toolmaker lathes and special designs for specified purposes. A complete compilation of lathe information.

Valves.—Toledo Steel Products Co., Toledo, Ohio. Catalog, 88 pages. Complete text and tables of information on valves, guides, springs, keys and inserts covering the company's super-forged products. Arranged in a conveniently indexed manner.

Hole Saw.—E. C. Atkins & Co., Indianapolis, Ind. Folder. Descriptive of the company's new replaceable blade hole saw in capacities from ⅞ in. to 4⅛ in. for use with hand drills or drill presses in metals, wood and plastic materials.

Cranes and Hoists.—Robbins & Myers, Inc., Springfield, Ohio. Catalog. Gives detailed information as to design, construction and installations of the company's electric hoists, cranes, fans and motors. Many industrial installations are pictured. Tables supply required information for preliminary planning.

Slings. — Macwhyte Co., Kenosha, Wis. Folder. Details the construction of a new sling employing a type of thimble which permits hitches to conform to requirements without changing sling equipment.

Stoker.—Combustion Engineering Co., 200 Madison Avenue, New York. Bulletin. Discusses air control, drive and furnace arrangement and presents a two page spread of typical settings as applied to different types of boilers. Numerous cuts of installations of the "Coxe" traveling grate stoker are shown.

Cleaning Barrel. — Pangborn Corpn., Hagerstown, Md. Bulletin. Descriptive of "Rotoblast" airless cleaning of castings and metal products. Diagrams abrasive action during the passage of parts from the loading to the unloading stations. Describes automatic abrasive reconditioning as a function of the equipment.

Lamp Hanger.—Thompson Electric Co., 1101 Power Avenue, Cleveland. Folder. Illustrates and describes the methods by which overhead lamps may be lowered by a pull mechanism for cleaning or replacements and likewise returned to a lighting circuit in locked position.

Skids. — Acme Steel Co., 2832 Archer Avenue, Chicago. Folder. Describes this company's method of shipping coil stocks and outlines the advantages from shipper to consumer.

V-Belt.—Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. Folder. Details the construction of "Condor" V-belts and presents comparative illustrations. Outlines the theory involved in construction.

Presses. — V & O Press Co., Hudson, N. Y. Folder. Pictures high-speed notching presses and equipment for rotors, stators and segments.